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Asking Questions

The give-and-take of asking and answering questions is central to learning and to effective teaching. The types of questions instructors pose and the sequencing of questions should capture students' attention, arouse their curiosity, reinforce important points, encourage reflection, and promote active learning.

General Strategies

Formulate questions in advance. As you prepare for class, identify questions and anticipate the range of student responses. Select and discard questions from your list as the discussion proceeds, depending on what topics your students want to pursue. To improve students' inquiry skills, use your opening questions to stimulate students to form their own questions. Ask a few questions that you are not quite sure how to answer. You may be impressed by your students' ideas. (Source: Haroutunian-Gordon, 1998; Windschitl and Buttemer, 2000)

Place your questions in order. You might want to move from the general to the specific, from the simple to the complex, or from the convergent (one answer possible) to the divergent (many answers possible). Select an order that will allow students to answer successfully the first time, especially to your opening questions. (Source: Pennell, 2000)

Prepare strategies for asking questions. Think about different ways to pose your questions: to the class as a whole, to pairs of students, to small groups. Create questions designed to prompt brainstorming, consensus building, or debate. (Source: Kasulis, 1984)

Decide how you will call on students. Some faculty call only on students who raise their hands; other faculty prefer to draw all students into the discussion by pointing to someone and requesting a response. If you go around the room calling on students in order, some students' attention may wander until it is their turn. If you choose to "cold-call" randomly on students with questions, warm up the situation first. For example, consider asking students to turn to a neighbor to

answer the question; pausing before calling on someone to give students time to think; writing the question on the board to help students gather their thoughts; or allowing students a moment to write a response, jotting down a few key points. (Source: Dallimore et al., 2004)

Convey a sense of spirited inquiry. Let your tone of voice, facial expression, and gestures suggest that you are seeking knowledge, not interrogating the troops. Be demographically inclusive in directing your questions and calling on students. (Source: Payne and Gainey, 2003)

Keep notes on class participation. Take a few minutes after each class session to note which questions generated the most lively exchanges. (Source: Kasulis, 1984)

Evaluate your questioning skills. The University of Illinois at Urbana-Champaign has developed guidelines for evaluating instructors' questioning skills ("Methods for Assessing Questioning Skills," n.d.) including sample surveys to administer to students to get their feedback. Acheson and Gall (2003) suggest dimensions on which students or instructors can evaluate an instructor's questioning behavior, including use of a variety of questioning strategies and behaviors that elicit student participation. See also Chapter 53, "Video Recordings and Classroom Observations" for advice.

Levels and Types of Questions

Vary the kinds of questions you ask. Move from simple questions to those that require more thought (adapted from Christensen, 1991; Elder and Paul, 2005; McKeachie and Svinicki, 2006; Rosmarin, 1987; Yip, 2001):

- *Exploratory questions* probe facts and basic knowledge: "What research evidence supports the theory of a cancer-prone personality?"
- *Challenge questions* examine assumptions, conclusions, and interpretations: "How else might we account for the findings of this experiment?" "What assumptions underlie this point of view?"
- *Relational questions* ask for comparisons of themes, ideas, or issues: "What premises of *Plessy v. Ferguson* did the Supreme Court throw out in deciding *Brown v. Board of Education*?"
- *Diagnostic questions* probe motives or causes: "Why did Simone assume a new identity?"

- *Action questions* call for a conclusion or action: "In response to a sit-in at California Hall, what should the chancellor do?"
- *Connective and cause-and-effect questions* ask for causal relationships between ideas, actions, or events: "If the government stopped farm subsidies for wheat, what would happen to the price of bread?"
- *Extension questions* expand the discussion: "How does this comment relate to what we have previously said?"
- *Hypothetical questions* pose a change in the facts or issues: "Suppose Sergei had been rich instead of poor. Would the outcome have been the same?"
- *Priority questions* seek to identify the most important issue: "From all that we have talked about, what is the most important cause of the decline of American competitiveness?"
- *Summary questions* elicit syntheses: "What themes or lessons have emerged from today's class?"

Tap different cognitive skills. Another way of categorizing questions follows from Bloom's classic hierarchy of cognitive skills (1956):

- *Knowledge* (remembering previously learned material such as definitions, principles, formulas): "Define *shared governance.*" "What are Piaget's stages of development?"
- *Comprehension* (understanding the meaning of remembered material, usually demonstrated by restating or citing examples): "Explain the process of mitosis." "Give some examples of alliteration."
- *Application* (using information in a new context to solve a problem, answer a question, perform a task): "How does the concept of price elasticity explain the cost of oat bran?" "How would you graph the data in a sample like this one?"
- *Analysis* (breaking a concept into its parts and explaining their interrelationships; distinguishing relevant from extraneous material): "What factors affect the price of gasoline?" "Point out the arguments the author uses to support his thesis about polar ice melts."
- *Synthesis* (putting parts together to form a new whole; solving a problem requiring creativity or originality): "How would you design an experiment to show the effect of education on income, holding other factors constant?" "How would you reorganize Bloom's taxonomy in light of new research in cognitive science?"
- *Evaluation* (using criteria to arrive at a reasoned judgment of the value of something): "To what extent does the proposed package of tax increases resolve the budget deficit?" "If cocaine were legalized, what would be the implications for public health services?"

Higher-level questions may also be sorted into three main types (adapted from Edwards and Bowman, 1996):

- *Convergent* questions invite the analysis and integration of existing data with the aim of arriving at a single conclusion.
- *Divergent* questions invite the respondent to elaborate on a conclusion to reach further implications or synthesis with other ideas.
- *Evaluative* questions involve making considered judgments based on data or evidence.

"What's the next important question we should ask?" is an excellent high-level question that shares with students the responsibility for directing the discussion (O'Hare, 1993). At times, you will also want to ask questions that encourage hunches, intuitive leaps, and educated guesses.

Effective Questioning

Ask one question at a time. In an effort to elicit a response, instructors sometimes attempt to clarify a question by rephrasing it. But often the new wording poses an entirely new question, which sends students off in another direction. The better strategy is to ask a brief question and wait for a response. Instead of "How are Lacan and Freud alike, for example, in their view of the unconscious, or how about their approach to psychoanalysis?" ask, "How is Lacan's theory of the unconscious similar to Freud's?" (Source: Hyman, 1989)

Avoid asking, "Any questions?" The question "Any questions?" often does not elicit any questions. A better approach is to imply that you are expecting questions and encourage students to ask them. For example, you might say, "At this point, I'm sure you have some questions" or "That was complicated. What did I leave out?" or "What questions are uppermost in your mind?" (Sources: Felder, 1994; Pennell, 2000)

Avoid asking yes-or-no questions. The discussion will stall if you ask questions that invite a one-word or short-phrase response. Instead, ask *why* or *how* questions that lead students to try to explain things. Instead of "Is radon considered a pollutant?" ask, "Why might radon be considered a pollutant?" Leading questions ("Don't you agree that climate change is the most serious environmental hazard we face?") also close off avenues for discussion. And the discussion will come to a halt if you answer your own question: "Why can't we use the chi-square test here? Is it because the cells are too small?"

Pose questions that invite multiple answers. A chemical engineering instructor avoids asking for the correct number by saying, "Before you calculate the answer, how do you predict the system will behave in general?" A history professor asks questions for which a number of hypotheses are equally plausible—"Why did the birth rate rise in mid-eighteenth-century England?" or "Why did Napoleon III agree to Cavour's plans?"—and emphasizes to students that these questions are matters of controversy or puzzlement to scholars. She also shows how different answers lead in very different directions. (Source: Felder, 1994)

Ask focused questions. An overly broad question such as "What about the fall of the Berlin Wall?" may lead students far off the topic. Instead ask, "How did the fall of the Berlin Wall—the reunification of Germany—affect European economic conditions?"

After you ask a question, wait silently for an answer. Do not be afraid of silence. Be patient. Students may need 10–30 seconds to form an answer to a question. Don't misinterpret silence as a signal of apathy, resistance, or laziness. Give students time to think and to word a response. Count to yourself while students are thinking; the silence rarely lasts more than 10–15 seconds. Waiting indicates that you want thoughtful participation, and if you communicate an air of expectation, someone will break the silence, if only to say, "I don't understand the question."

If the silence exceeds 30 seconds, ask your students what the silence means: "The room has grown quiet. Why?" Or encourage them by saying, "Could someone get us started?" Even then, you might delay calling on someone until several hands are raised; pausing lets students know that replies do not have to be formulated quickly. Wait again after a student has responded, in order to indicate that the response is worth thinking about. Waiting helps students focus on what their peers say instead of planning their next remark. (Sources: Biggs, 2003; Pennell, 2000)

Search for common ground. If one student immediately gives a response, follow up by asking others what they think. "Hadley, how strongly do you agree or disagree with that?" is a good way to involve more students in the discussion.

Ask questions that require students to demonstrate their understanding. Instead of "Do you understand?" or "Do you have any questions about this?" ask, "What are the considerations to keep in mind when you want your evaluation results to be used?" Instead of "Do you understand this program command?" ask, "How would we change the program if we wanted to sort the numbers

in ascending order rather than descending order?" Instead of "Does everybody see how I got this answer?" ask, "Why did I substitute the value of delta in this equation?" (Source: Pennell, 2000)

Structure your questions to encourage student-to-student interaction. Students become more attentive when you ask questions that require them to respond to each other. For example, ask Molly, "Could you relate that to what Sam said earlier?" and, if needed, help Molly recall what Sam said. (Source: Kasulis, 1984)

Draw out reserved or reluctant students. A disguised question may encourage students who are hesitant to speak. For example, instead of "What is the essence of John Dewey's work?" saying, "I wonder if it's accurate to describe John Dewey's work as learning by doing" gives a student a chance to comment without feeling put on the spot. Similarly, these kinds of questions are more likely to engage quiet students: "What aspects of the readings do you think we should discuss?" "What part of the reading surprised you the most?" "Can you give me one or two points from the chapter that seem especially important?"

Use questions to change the tempo or the direction of the discussion. Use questions to pace or redirect the conversation (adapted from Kasulis, 1984):

- *To lay out perspectives:* "If you had to pick just one factor . . ." or "In a few words, name the most important reason . . . ." This form of questioning can also be used to cap talkative students.
- *To move from abstract to concrete, or general to specific:* "If you were to generalize . . ." or "Can you give some specific examples?"
- *To acknowledge good points made previously:* "Zhong, would you tend to agree with Carmen on this point?"
- *To summarize or conclude:* "Sabah, if you had to pick two or three themes that were most frequently expressed today, what would they be?"

Use probing strategies. Probes are follow-up questions that focus students' attention on ideas or assumptions implicit in their first answer. Probes can ask for specifics, clarifications, consequences, elaborations, parallel examples, relationships, or explanations. Probes are important because they help students explore and express what they know, even when they aren't sure they know it (Hyman, 1980). Here are some examples of probing (based on Goodwin et al., 1985):

INSTRUCTOR: What are some ways we might solve the energy crisis?
STUDENT: Peak-load pricing by utility companies.

INSTRUCTOR: What assumptions are you making about consumer behavior when you suggest that solution?

INSTRUCTOR: What is neurosis?
STUDENT: It's a condition in which . . . a state in which . . . (*pause and shrug*)
INSTRUCTOR: What are the characteristics of a neurotic person?

INSTRUCTOR: How far has the ball fallen after three seconds?
STUDENT: I have no idea.
INSTRUCTOR: Well, what is happening to the speed of the ball?

Occasionally poll the class. Ask for a show of hands: "Who believes that military dictatorship was, more or less, a foreseeable outcome of the French Revolution?" Follow up by asking individual students to offer reasons for raising or not raising their hand.

Responding to Students' Responses

Listen to the student. Do not interrupt a student's answer, even if you think the student is heading toward an incorrect conclusion. Interrupting signals your impatience and hinders participation. Instead, wait a second or two after a student responds to be sure that the student is finished speaking.

Use nonverbal cues to indicate your attention. Maintain eye contact with the student who is speaking. Nod your head, use facial expressions or hand gestures to prompt the student to continue, or adopt a stance that signals you are ready to move on.

Vary your reactions to students' answers. Depending on the student's comments, you might respond in one of the following ways (adapted from Hyman, 1989; Kovacs-Boerger, 1994; Yelon and Cooper, 1984):

- Reinforce the point by restating what the student has said.
- Paraphrase the student's response without judging its correctness to give the student time to rethink the answer, especially if the paraphrase highlights underlying assumptions.
- Ask for clarification: "Could you be more specific about . . .?"
- Invite the student to elaborate: "We'd like to hear more about . . . ."
- Expand the student's contribution: "That's right, and following up on what you said . . . ."

- Acknowledge the student's contribution and ask for another view: "You're right about children's linguistic capabilities, but what about their social development?"
- Acknowledge the originality of a student's ideas: "Self-selection factors could be responsible for the outcome. I didn't think of that."
- Nod or look interested but remain silent. You don't need to comment on every response. A silent nod keeps the focus on the students' responses. After a few students have commented, you can condense or combine their comments, and relate them to each other.

Judiciously praise correct answers. Students look to their instructors for guidance and support. Be enthusiastic in your praise rather than offering a bland "OK," "Yes," or "All right." If you want to elicit more responses, however, follow the praise with another question: "Combustion? That's very good. What other outcomes are possible?" The downside of praising every answer is that it becomes awkward when a student gives a vague or irrelevant answer. (Sources: Hyman, 1989; Tiberius, 1999)

Tactfully correct wrong answers. Wait a few seconds before responding to an incorrect answer, in case another student volunteers a better response. Or look to another student to provide help rather than providing help yourself. When an answer is partly correct, avoid responding "Yes, but . . . ." Instead, encourage students to rephrase or revise incorrect answers. Try to correct the answer, not the student: "I don't believe that answer is correct" instead of "Gary, you are wrong." Look beyond the answer to the thought process: "This is a hard concept to grasp. Let's take this a step at a time" or "You're right about one part, but let's figure out the rest together." Sometimes wrong answers or incorrect but logical directions can be used to help the class figure out the correct answer, for example, in designing multistep experiments to answer scientific questions.

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Fielding Students' Questions

When answering a student's question, instructors must think about the content, the tone, and the timing of their response. The following tips describe techniques for handling both routine and difficult questions and questioners.

General Strategies

Answer most questions directly. Offering a direct response signals that the question is worthwhile: "Yes, I do think that historians have portrayed the Trail of Tears inaccurately." But sometimes it is worthwhile to give students a chance to answer. If you redirect a question to the class at large, let the questioner know that you are not avoiding or dismissing the question: "After we hear what everyone else wants to say, I'll see if there's anything left to add." (Sources: Cashin, 1995; Duell, 1994; Hyman, 1989)

Point students toward an answer. Sometimes you can rephrase a student's question in a way that points toward an answer ("Sarah, have you thought about . . . ?") A faculty member in architecture turns students' questions about design issues back to them. When a student asks, "Should I put the kitchen on the north or south end?" the instructor asks the student, "Why might you want the kitchen on the north end?" Or you can turn some students' questions back to the class: "What do others of you think are the reasons the Treaty of Guadalupe Hidalgo was ignored?" Doing so not only encourages more class participation but also reminds students that their peers are a resource.

Avoid comments or gestures that discourage students' questions. Students may refrain from asking questions if they sense that their instructor doesn't want to hear them. A dismissive response to a student's question ("We discussed that last time" or "That question is not really on point") discourages future questions. Other disincentives include interrupting the questioner, avoiding eye contact, answering questions hurriedly or incompletely, and treating questions as distractions rather than as contributions to the learning process. (Source: Hyman, 1989)

Admit when you don't know the answer. If you are uncertain about the correct answer, it is usually better to say so ("I'm not sure; let me think about it. It's a good question") than to give a wrong answer and have to correct yourself later. Other ways to respond include the following (adapted from Cashin, 1995):

- Ask whether a student has an answer (and check the answer before the next class).
- Suggest resources that would enable the questioner to answer the question (but note that assigning students to look up answers to their questions may lead students to ask fewer questions).
- Show students how to think out loud about the answer.
- Volunteer to find the answer yourself and report back at the next session.

In scientific fields, sometimes a question may not yet have an answer. The best you can do is mention the cutting-edge nature of the question and speculate on possible responses.

Answering Routine Questions

Call on questioners in the order in which they sought recognition. If several students want to ask a question, announce an order ("Lizzie first, then Joe, then Alex"). Remember that students may stop listening once their hands go up and they know what they want to say.

Thank the student for having asked a question. "Excellent question" and "Thanks for asking that" are comments that reinforce the behavior of asking questions. Better still, mention what makes the question a good one: "That question takes us directly to the relationship between inflation and wages."

Repeat and paraphrase some questions. Use repetition and paraphrase to make sure that everyone has heard the question and to test your understanding of it. Sometimes a paraphrase may help the student answer his or her own question. But do not repeat or paraphrase every question. Such repetition dissuades students from listening to one another and runs the risk of boring the class. Asking students to rephrase or restate a question (your own or one posed by another student) and asking them to compare different ways of posing a question may help them answer it. (Sources: Cashin, 1995; Dillon, 1998)

Prompt students to clarify their questions. If you don't understand a student's question, ask for clarification: "Give me an example" or "Do you mean . . .?" Instead of "Your question isn't clear," say, "I'm sorry, I don't understand your question."

Don't answer a question that is based on a false presupposition. If you recognize that a student's question is based on an incorrect assumption, address that assumption, perhaps by asking the other students to comment on it. (Source: van der Meij, 1998)

Delay answers to questions that will be covered later. If the question will be addressed later in the session, mention this and return to the question at the appropriate time. When you reach the topic, let the student know you have remembered the question: "Here is the answer to the question you asked before, Harun." (Source: Cashin, 1995)

When responding, talk to the whole class. Don't focus solely on the questioner, but look around the room to include all the students in your comments.

Check back with the questioner. Before moving on, confirm with the student that his or her question has been answered satisfactorily: "Was that what you were asking?" or "Did that help you?" (Source: van der Meij, 1998)

Handling Difficult Questions and Questioners

Avoid dismissing a naïve question. Sometimes a simple-sounding question can provoke an animated discussion, and even the oddest question deserves a tactful response. Because your students empathize with the questioner, your efforts to put a nervous or confused questioner at ease will win you the class's goodwill (Sprague and Stuart, 2005). Consider the following two sets of responses (Sprague and Stuart, p. 403):

Not: "Well, as I already said . . . ."
But: "Let me go over those data again."
Not: "You've totally confused fission and fusion."
But: "Many of those problems relate to nuclear fission. The fusion reaction is quite different. It works like this . . . ."

Try to answer twice, then let a student try. If your first and second answers don't satisfy the questioner, ask your class for help: "Sorry, I've gotten myself stuck here. Could someone help me by explaining it in their own words?" When answering the question would take the class too far afield, or when students continue to disagree, suggest meeting outside of class for further discussion. (Sources: McAllister, 1994; McNinch, 1999)

When students raise complex or tangential questions, ask them to stop by after class. Some questions go beyond the topic of discussion: they anticipate an upcoming topic, seek more detail, or raise a new issue. When such questions require a lengthy response or a detour from the topic, offer to answer them after class or during office hours.

Be patient with students who ask questions you have already answered. Although you may have already discussed a topic or even answered an identical question, students may not have understood the point at the time. Only later, when the material makes sense to them, does the particular point become meaningful. When answering repetitive questions, try to use different language and examples so that you don't bore students who grasped the idea earlier. Or consider asking another student in class to answer the question.

Preempt long-winded questioners. Occasionally, a student may incorporate extraneous opinions and comments into a question. One way to respond is to answer what appears to be the student's main point, and then recognize another student. For example: "You want to know why the university refuses to divest. The Regents' position is that the Global Sullivan Principles of Social Responsibility are sufficient. Let's hear from Jean; she's had her hand up for a long time." (Source: Sprague and Stuart, 2005)

Preempt the serial answerer/questioner. Some students will eagerly answer every question you pose or dominate the class with their own questions. Here are some tips on responding to these students (adapted from PsychTeacher and POD listserv):

- Meet privately with the student. Tell the student how pleased you are that he is so engaged in the class and has so many interesting things to say. Explain that your goal is to give everyone a chance to participate, and ask this student to wait at least 30 seconds before raising his hand to answer a question. You could also set a limit on the number of times you will call on this student in class and have the student come to office hours to discuss any remaining questions.
- Announce the order of students you will call on. "Bryan, in a minute I'm going to ask people to describe a real-life example of a workplace conflict. Will you please be first? Then, Michele and Debbie, will you be second and third?"
- Before calling on the serial answerer say, "I'd like to hear from someone who hasn't said much today." To reassure serial students, call on them at least once during class.
- Ask students to put their answers in writing and share their responses with their neighbors.
- Move around the room and stand with your back to the serial answerer when you ask a question.

Cut off students who want an extended dialogue. If a student is reluctant to relinquish the floor, end the exchange and offer a compliment or an invitation: "You've raised quite a number of excellent points. Maybe you can come to my office later and talk with me further." Or "You've made a number of good comments; why don't we hear from someone else as well?" (Source: Sprague and Stuart, 2005)

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