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ABSTRACT

This paper focuses on the answering and asking of questions in college-level courses and makes suggestions regarding questioning techniques for lecture classes and discussion groups. "Question" (Q) is defined as "any eliciting of an answer (response) regardless of grammatical form. "Answer" (A) is defined as "any response that fulfills the expectation of the question." "Reaction" (R) is defined as "any response that modifies (clarifies, expands) or rates (positively or negatively) a previous statement (question, answer, or another reaction)." It is pointed out that instructors experience difficulty in handling pauses and silence after posing a question, and it is recommended that instructors wait for a response. It is emphasized that it is desirable for an instructor to create a classroom atmosphere that welcomes questions from students. This atmosphere can be evoked by the teacher's asking for questions, listening to the students' questions adequately and answering the questions without belittling the students. (Contains eight references.) (CK)

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Answering and Asking Questions

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This paper is concerned with the answering and asking of questions in college-level courses. It makes suggestions regarding questioning techniques that are appropriate for lecture classes as well as for discussion groups.

We have adapted the approach used by Hyman (1974) because it has been found by many instructors to be a useful way to understand what goes on in class. Therefore, throughout the paper we will use the terms "question," "answer" (response), and "reaction" as follows:
question (Q)—any eliciting of an answer (response) regardless of grammatical form;
answer (A)—any response that fulfills the expectation of the question;
reaction (R)—any response that modifies (clarifies, expands) or rates (positively or negatively) a previous statement (question, answer, or another reaction).

EXAMPLE
"Who is president of the United States?" **(Q)**
"That's too easy." **(R to Q)**
"No it isn't" **(R to R)**
"George Washington." **(A to Q)**

In general, when considering changing an approach to your teaching, ask yourself: What exactly goes on in class? What do I do? What do the students do? For example, imagine yourself in class when one of the students asks you a question. What do you usually do? It is quite possible that you simply answer it. If your goal is to increase the students' knowledge, this is quite appropriate. However, if your goal is to develop the students' thinking skills, you may wish to begin a dialogue or use another technique to help the students discover their own answers.

It may be that when you try to recall how you act in class, you cannot remember clearly. Video or audiotaping your class can provide a wealth of detail, and in a format where you can replay portions or can play it for one or more of your colleagues.

I. Students Asking Questions

What are some things that you can do when asked a question other than directly answering it?

1. ***Repeat* the question, paraphrasing it.** This serves two purposes: it insures that the entire class hears the question; more importantly, it lets the questioner check your understanding of his or her question. When you have *not* completely understood, often the student will rephrase or elaborate upon the question. In doing so the student is often "thinking out loud" and may come to his or her own conclusions without further help. This process also gives the other students time to think about the question and possible answers to it.

EXAMPLE (Introductory Psychology)
Student: You've said that learning is defined as changes in behavior that result from past experience, but can't people learn without any change being apparent? **(Q1)**

Instructor: You're questioning whether learning *has to be* tied to observable change **(R to Q1)**, right Ann? **(Q2)**

Student: Right **(A to Q2)**, although given our definition of psychology, I guess it would have to be perceivable in some way. **(R to Q2 and A to Q1)**

2. ***Redirect* the question.** You might ask another student (one who might know the answer) to respond; or you might redirect the question to the class in general, asking for an answer or comment, or an elaboration upon the issue. This procedure not only encourages more student participation, but it also implies that peers are a resource for learning.

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EXAMPLE (Seminar on Urban Problems)
St. 1: If people know about all of these harmful effects that pollute the environment, why doesn't the government stop the polluters? **(Q1)**

Inst.: Bill is asking, why don't our political leaders do something about those things that we know hurt the environment. **(R to Q1**, paraphrasing it.) What are some reasons the rest of you can think of that might explain this apparently illogical behavior? **(Q2**, redirecting Q1 to entire class.)

St. 2: Well, many of the things people do that cause pollution also have a lot of benefits: factories produce goods we want, provide jobs, etc. **(A to Q1 and Q2)**

3. Ask *probing* questions. You might respond to the student's question by directing her (or his) attention to a particular aspect of the issue she has raised, or drawing her attention to some previously learned course material that is relevant to answering the question or by going beyond what the student has said in some way. The intent of probing questions is to draw the student's attention to things that may be only implied in her answer, and so help her answer her own question.

EXAMPLE (American History)
St.: I think you can argue that the American Revolution wasn't justified. The colonists were better off than most Europeans. **(Q1)**

Inst.: That's a good point, Cindy. **(R to Q1**, praising student) It might help if we considered how the British government treated the colonists compared with their treatment of people living in England. **(Q2)**

St.: Well, it was true that the colonists thought that they were not given the rights of British citizens. **(A to Q2)**

COMMENT: The instructor's question (Q2) focuses upon comparing the colonists with Englishmen rather than with other Europeans. The instructor implies that this is a more appropriate comparison (because the colonists thought of themselves as deserving the rights of Englishmen).

4. Promote a *discussion* among the students. The three previous suggestions usually involve communication between two people, typically the instructor and one student, with the rest of the class simply listening. It may be that you will want to involve the majority of students in trying to answer some questions, for example, where there is considerable difference of opinion about the answer.

EXAMPLE (Human Sexuality)
St. 1: It really seems to me that abortion has to be considered murder, no matter what "justification" people give for it.

St. 2: I disagree, that is just repeating some abstract principle without considering the other side of the argument, for example, a woman who has been raped.

Inst.: These two comments, together with other things members of the class have said, suggest to me that there are strong disagreements about abortion. I think it might help if we spent some time discussing it. I'd like you to get into buzz groups of three or four people each (see McKeachie, 1993, for a description of buzz groups) and spend about ten minutes coming up with as many arguments *for* and *against* abortion as you can. When you've finished we'll discuss them.

One reaction we generally do *not recommend* when a student asks a question is to assign that student the task of looking up the answer. Frequently all this practice accomplishes is to teach the class *not* to ask questions.

II. Answering Questions

Because Part I concentrated upon ways to help students answer their own questions, the suggestions dealt with **reactions** to student questions rather than answers. The remaining parts of this guide discuss various aspects of questioning behavior that are not necessarily directed towards helping students answer their own questions.

5. *Directly* answer the question. One obvious option an instructor has when a student asks a question is to answer it. In general, we do *not* recommend answering a student's question directly if you wish to foster thinking or problem-solving skills. However, when the questions ask for information that other students in the class are not likely to have (or questions asking for the instructor's opinion), directly answering the question is appropriate. Directly answering questions takes less time than attempting to have a student or the class come up with answers. If you choose to answer directly, make your answer brief and to the point. After responding you may want to check to see if you have really answered the question by saying something like: "Does that answer your question?" or "Was that what you were asking?" etc.

Sometimes an instructor would like to use a student's question as an opportunity to bring in a related topic that the **instructor** wishes to cover, reasoning that students learn better when they see the material as relevant to their own interests. This should be done with care or it may only confuse everyone. Answer the student's questions first, then be explicit that you are covering something else that is on *your* agenda.

EXAMPLE (Introduction to Literature)
St.: Who wrote the first novel in English? **(Q1)**

Inst.: Most experts consider Samuel Richardson to be the first modern English novelist. **(A to Q1)** He wrote *Pamela* in 1740. **(R to A**, elaborating on answer) While

we are on the topic of the novel, I'd like to . . . . (Instructor clues the class that she is going beyond the student's question.)

COMMENT: It is not unusual when the instructor herself is handling a discussion or recitation section of a course for which she gives the lectures, to use the occasion of students' asking questions about material previously covered to add *new* material that could not be included in the lectures because of lack of time. We recommend *against* this because it may serve only to confuse the students and make them feel less positive about the course when compared with recitation sections handled by GTA's who primarily answer questions to clarify those parts of the lecture that some students did not understand.

6. *Postpone* answering the question. Students are more likely to learn and remember if the instructor answers their questions when they ask them. Nevertheless, on certain occasions you may decide to put off answering a question, for instance: when you are very short of time, especially if the answer is complex, or when the material will be covered in an upcoming class, or when the answer is of interest to only a few students. When the material is covered later, call it to the student's attention: "Here is the answer to the question you asked before, Frank . . . ." If the answer will *not* be covered during the course, we recommend that you offer to answer it after class or make an appointment to get together with the student sometime. By doing this you very clearly communicate to all of the students your willingness to try to answer their questions. Generally, you should answer more questions than you postpone or you are likely to find the students asking fewer and fewer questions.

EXAMPLE (Physiology)
St.: Doctor, I still don't really understand the Kreb's cycle, could we review it, please? **(Q1)**

Inst.: Fred, we're running out of time. **(R to Q1)** Can you see me after class and we'll arrange a time when we can get together for a half hour or so? **(Q2)** For now follow as best you can. (Further reaction to Q1 letting student know that the instructor is aware of the learning problem.)

7. *Discourage* inappropriate questions. Usually students ask questions because they wish to learn, but sometimes a student will ask a question to sidetrack the class, to get attention, or even to embarrass the instructor. Handling such questions presents a dilemma. If you treat them like other questions you may encourage the student to ask more of the same, but if you turn that student down abruptly you may discourage not only that student but the rest of the class from asking any kind of question. In reacting, it is probably best to tactfully indicate what about the question is inappropriate.

EXAMPLE (Physics I)
Inst.: Any questions about the material we covered last class? **(Q1)**

St.: I don't have a question about that **(A1 to Q1)** but I was reading about a physicist who has a theory about racial inferiority and I don't see what right a physicist has to teach something like that outside of his field. **(Q2)**

Inst.: That's a legitimate question, Gail, since this is an introductory physics course **(R to Q2**, supporting student) but it takes us pretty far afield from vectors and forces. (Further reaction, raising issue of appropriateness) How many students would like to spend some class time talking about Gail's question? **(Q3)**

St.: (Only five students raise their hands. Their action can be considered **A2 to Q3**)

Inst.: Well, why don't you five see me after class and we can set up a time to get together to discuss it. **(R to A2)**

COMMENT: If a majority of the class indicated an interest in discussing the topic, perhaps the instructor would want to spend some of the class' time, especially if one of the important objectives of the course was for the students to gain a broader understanding and appreciation of science. It seems to us that lecture outlines and course syllabi are not railroad tracks that you must never leave, rather they are the main road that you intend to travel, but with time for some interesting side trips. On the other hand, if the primary objective of the course was for the students to learn skills needed in their prospective professions, the instructor might suggest a meeting outside of class or perhaps recommend one or two articles discussing the question that interested students could then read.

New teachers especially are often uncertain how to tell whether a student really wants an answer or has some other purpose. This is probably best learned through experience and new teachers will have to risk relying on their own judgment. One criterion is how relevant the point of the question is to what the class is trying to learn.

8. *Admit* when you do *not* know an answer. If you do *not* know the answer to a student's question, we recommend that you say so. Although one of the roles of a college teacher is that of "expert" and "information source," admitting that you do not know the answer to a question will probably not damage the students' confidence in you. In fact, giving the students clues about

how certain you are of your answers is likely to increase their confidence in you, for example: "The experts agree that. . . .," "as I recall they found. . . .," "I'll have to look that up. . . .," etc. On the other hand, if you try to fake it, there is a good chance the students will find you out and your credibility will be seriously damaged. Unless the question is tangential to the objectives of the course, we recommend that you assume responsibility for finding the answer to questions you do not know and report back to the entire class.

EXAMPLE (Food Management)
St.: What effect does the use of the preservative BHT have on the amount of breakage in cookies? **(Q1)**

Inst.: That's a good question, Howard **(R to Q1)**, unfortunately I don't have a good answer; I don't know. **(A1 to Q1)** I'll have to find out and let you know. (Further reaction to Q1)

Inst.: (Next class) Regarding Howard's question last class about the effect of BHT on the breakage of cookies, what they have found is . . . . **(A2 to Q1)**

III. Asking Questions

9. Ask *open*-ended, not just *close*-ended questions. A *closed*-ended question structures the response for the student and can be answered by one word, often "yes" or "no", or by a very brief phrase. An *open*-ended question leaves the form of the answer up to the person answering and so elicits much more thinking or information.

EXAMPLE (Counseling)
Inst. A: If one of your counselees told you that she had plagiarized most of her doctoral dissertation, would you report it to her major professor? (Closed-ended question. Can be answered by a "yes" or "no.")

Inst. B: If one of your counselees told you that he had plagiarized most of his doctoral dissertation, would you report it directly to his major professor, inform the major professor anonymously, or say nothing? (This is also a closed-ended question, the instructor has given the student three choices.)

Inst. C: If one of your counselees told you that she had plagiarized most of her doctoral dissertation, what action would you take concerning informing her major professor? (Open-ended, probing question leaves choices of answer up to the student.)

Closed-ended questions are most appropriate when the instructor wants to check whether the students have learned or remembered specific information, or to get or keep their attention. If an instructor wishes to encourage student involvement, open-ended questions are preferable because they require a more complex student response. Instructors sometimes complain that students never enter into a discussion, that they answer only in monosyllables. This may be because that is the only kind of answers our questions permit.

10. Ask *divergent* as well as *convergent* questions. The distinction between convergent and divergent questions is whether there is a single or accepted "correct" answer (to a *convergent* question) or are there a number of possible answers, many of which may be acceptable (to *divergent* questions). Convergent questions may expect the student to repeat some conventional wisdom. Divergent questions often require new, creative insights.

EXAMPLE (Sociology)
Inst.: According to our textbook, in what ways does the present welfare system solve the problems of poverty? (Convergent question, the range of acceptable answers is determined by the textbook.)

Inst.: What are some ways in which the country might solve the problems of poverty? (Divergent question, a wide range of acceptable answers are possible.)

COMMENT: Notice that question 1 is an open-ended question even though a convergent one. Convergent questions are often closed-ended; divergent questions must always be open-ended.

Some answers to divergent questions may be more acceptable than others in terms of logical consistency, synthesis of relevant data, solutions of major aspects of the problem, etc. The major advantage in asking divergent questions is that the task they set for the students is to think about an issue or problem, *not* to discover the "correct" answer or the answer the teacher is looking for. Usually students are more willing to attempt answering divergent questions because they run less of a risk of giving a "wrong" answer. Also divergent questions require a "higher" level of thinking (cf. Gronlund, 1985). They cannot be answered from just memory (unless the student has already been exposed to answers to the question in a lecture, reading, etc.).

We have emphasized divergent questions because they are employed less frequently, even in college-level instruction. We do not mean to imply that instructors should not ask convergent questions. In so far as what is taught at the college-level deals with correct answers, convergent questions are obviously appropriate. What we do wish to caution against is using mainly convergent questions, especially when trying to teach divergent thinking!

IV. Pauses and Silence

One difficulty found by both novice and veteran instructors is deciding how to handle pauses and silence after asking a question. We will argue that pauses and silence can play a useful role in both lecture and discussion classes.

11. *Wait*, pauses and silence are *not inappropriate* class behaviors. The discomfort many, if not most, instructors feel when a pause leads to an extended silence probably stems from a cultural norm for social conversation where the silence is taken to mean that there is some inadequacy in the communication. This discomfort often is especially acute for new teachers *or* teachers who lack self-confidence. If such an instructor were to tape record his class, he might find that these pauses actually last only a few seconds. very often less than five, not the "eternity" it seemed during the wait. In the classroom, constant talking is neither required nor desirable.

12. *Wait*, give the students *time to* think. The basic reason for pausing after asking a question is to give the students time to think about possible answers. If the question is worthwhile (and more than rhetorical), even at the memory level, it deserves a wait. Questions at higher levels require considerable time—minutes—for students to think before they can adequately answer.

After an appropriate wait (listening to tape recordings of one's class is a useful means of checking whether the length of the pause was appropriate), you may want to simply acknowledge the pause by saying something like: "It's a difficult question and takes some time to think about." This clues the students that you are willing to wait for their responses. Or you may want to rephrase the question or ask a probing question which would draw the students' attention to relevant information.

If you really want the **students** to answer the question, you must give them enough time. You might want to try one or more of the active learning techniques (cf. Bonwell & Eison, 1991). Give the students a few minutes **to write out an answer**. Have the students **work in groups of two or three** to solve the problem, or propose possible solutions. Such techniques require that all of the students are actively working on the answer, not just the smarter or faster students.

13. *Wait*, or you will establish an *undesirable norm*. Classes, like any group, fairly quickly establish norms, that is, standards of what will be considered acceptable behavior in that group. If, in the first week or two of class, the instructor waits only a few seconds before answering her (or his) own questions, the class will quickly learn that when the instructor asks a question she does *not* expect an answer; wait a few seconds and she will answer it herself. Students are often more than willing to let the instructor answer all of the questions. If you want your students to answer the questions you ask, you must be careful to cultivate that expectation by waiting after you ask a question.

V. Creating an Accepting Atmosphere

If encouraging students to ask questions is desirable behavior in most college classrooms, then it is also desirable that the instructor create an atmosphere where students are *not afraid* to ask questions for fear of embarrassment, etc.

14. *Ask* for questions. If you want the students to ask questions, give them opportunities to do so. Pause after making an important point or explaining a topic, or say "Any questions?" or "Are you with me?" or "Do you want me to say more?" However, such statements must be more than rhetorical or used as a technique for you to get your thoughts together before going to the next point. Give the students time to formulate their questions before you move on. Also, look at the students to make sure you do not miss someone with his or her hand up.

We think pausing and asking for questions is an effective teaching device to use routinely; but if you are aware that some students are confused, it becomes a must. When some students are frowning or shaking their heads saying something like, "Some of you seem puzzled, what don't you understand?" should solicit questions that will help you clear up the misunderstanding. Some college professors feel that they have done their duty by professing the material to the students. We believe that unless instructors help their students to learn, they are *not* teaching.

15. *Answer* questions. If you want your students to ask questions, then you should reinforce them when they do by answering their questions. Therefore we suggest that you rarely postpone answering a question or ignore student questions, which is what we do if you do *not* call upon a student who has his hand up.

It is not unusual in a class of any size to have one or more students who tend to monopolize class time. One approach with such students is to give preference to those who have *not* yet said anything. This can be done explicitly by saying, "Let's take comments from people we haven't heard from," or "Vincent, I've already answered several of your questions, let's hear from some of the others first." Very often other students will ask "Vincent's question" and so he will get his answers but others will have a chance to participate. If he still has a question after everyone else's has been answered, you probably should let him ask it.

Also it is not uncommon for a class to have at least one student who appears to be antagonistic toward the instructor or hostile to the subject matter and who asks questions that serve only to express the student's disagreements, which often have little generalizability to the rest of the class. Because such questions usually stem from emotional rather than intellectual concerns, answering only on a cognitive level serves little purpose. It is probably best to see that student outside of class and explain what seems to be going on from your point of view. Often such a talk is sufficient to enable the student at least to censor the questions he or she asks in class, although it may do little to solve the underlying problem.

16. Answer students questions *adequately*. It is not enough that you respond to the student's questions, but you must answer the question to the student's satisfaction as best as you can. Your answer should be concise and to the point, and you should ask the student if you have answered the question. This fosters both accurate communication of content and says to the student "Your question is important and I will take the time necessary to answer it if I can." If, after two or three attempts, you still have not answered satisfactorily, and other students cannot help answer it, then it is appropriate to suggest getting together after class.

17. *Listen* to the question, or to any student comments. The way you listen to a question or comment also communicates your attitude toward the students. In most U.S. cultures look at the students when they are talking; show that you are following by nodding, etc.; check whether you really understand what they are saying by rephrasing the question.

Sometimes little things that we do unknowingly communicate something to students that is very different from what we intend. For example, one instructor used to occasionally take a look at his watch when a student would ask a question. He found out in the end-of-course evaluation that one student interpreted this to mean that the instructor felt the questions were wasting time, rather than that the instructor simply wanted to know what time it was.

18. Do *not* put down the students. In general, you should avoid anything which would embarrass the student who asks the question. Here are a few instructor responses well-calculated to insure that the student asking the question will *not* ask any more questions. We have suggested possible alternatives.

EXAMPLES
(Poor) You should know that we covered that in. . . .
(Better) What about. . .that we covered. . .weeks ago, how does that fit in?

(Poor) You're completely wrong.
(Better) How would you reconcile what you're saying with. . . .(something previously covered).

(Poor) I entirely disagree.
(Better) I'm not sure I agree, (or I think I disagree) because. . . .

Rather than responding with a value judgment to a student's question or comment, ask a probing question. You may help the student arrive at the correct answer, or an acceptable answer; in which case, rather than proving the student "wrong", you have helped him or her to be "right."

POST SCRIPT

We hope that the distinctions and suggestions made in this paper will enable you to gain a clearer view of your classroom questioning behavior and so will help you to improve by increasing the number of alternatives available to you when considering how to handle questions in your classes. We would like to repeat our conviction that there is no one, correct approach—several roads lead to Rome. The approach *you* finally decide upon will depend upon you, your students, your course objectives, and other *unique* considerations.

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