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# Effective Questioning Techniques[1]

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The use of questioning as an educational tool has a long and revered history. Research shows that teachers ask between 300–400 questions per day, the majority of which are short in length, directed to a particular student, and have a specific answer for which the teacher is seeking. Likewise, the answers these types of questions solicit are correspondingly short and simple (Department of Education, Tasmania, School Education Division, 2008).

Almost all discussions of questioning techniques begin by invoking the name Socrates. Undeniably, the Socratic method of using questions to explore an assumption, dissect options, and lead to new knowledge is an effective teaching technique.

## Purpose of Questions

Teachers ask questions of their students for a variety of reasons. Some of those include the need to:

- Assess the level of students' comprehension.

- Develop student interest or motivation.

- Develop thinking skills.

- Establish relationships between concepts.

Almost all teachers routinely ask questions during instruction. Some are highly proficient in their use as a teaching tool, whereas others achieve little instructional benefit and use questions in an almost mechanical fashion.

## Level of Questions

Questions are often divided into two categories: lower-level and higher-level questions. Lower-level questions are those asked at the knowledge, comprehension, and simple application levels of Bloom's Taxonomy (Bloom, 1956). Higher-level questions require complex application, analysis, synthesis, and/or evaluation skills. According to Goodwin, Sharp, Cloutier, Diamond, and Dalgaard (1992), lower level questions are appropriate to:

- Evaluate students' preparation and comprehension.

- Diagnose students' strengths and weaknesses.

- Review and/or summarizing content.

Higher-level questions are effective when the instructor is trying to:

- Encourage students to think more deeply or more critically.

- Solve problems.

- Encourage discussions.

- Stimulate students to seek information on their own.

Most instructors ask both types of questions within a single class period. For example, an instructor may ask a student to "*Explain how green plants improve air quality*." If an inadequate answer is given, the instructor may move to questions at a lower level of the taxonomy to check for understanding. For example, the instructor may ask, "*What is the definition of plant respiration?*" If students cannot answer those questions, the instructor might briefly review the material. If students can answer lower level questions, the instructor may then move to higher level questions.

Note that it is not essential that an instructor be able to classify each question at a specific level, or ask higher level questions – if the intent of the questions asked is to address a purpose best accomplished by lower-level questions. Table 1 provides a summary of the taxonomy of lower and higher level questions.

## Open and Closed Questions

In addition to asking questions at the various levels of Bloom's Taxonomy, an instructor can also choose to ask questions as either open-ended or closed-ended questions. An open-ended question is one in which there are several acceptable answers. For example, "What is an example of a plant process?" is a question that could have several answers: photosynthesis, transpiration, respiration, etcetera. If the student answers with any of these, the answer would be correct.

A closed question is one in which only a limited number of acceptable answers exist. For example, "What is the definition of osmosis?" requires that the student refer to the presence of a semi permeable membrane. If not included in the response, the answer would be incorrect.

Both open and closed questions may be used at any level of Bloom's Taxonomy. For example,

- an open low-level question might be *"What is an example of a plant process?"*

- an open high-level question might be *"What are some ways we might solve global warming?"*

- a closed low-level question could be phrased as *"What are the products of photosynthesis?"*

- or, a closed high-level question delivered as *"Given the advantages and disadvantages of organic farming, how would you evaluate the effectiveness of methods currently employed in preventing E. coli outbreaks?"*

## General and Directed Questions

Questions may be asked of an entire class whereby the instructor chooses a volunteer to answer the question. At other times the instructor may want to ask a question of a particular student. The former is referred to as a *general* question, with the latter known as a *directed* question. Both have specific intended outcomes. For example, general questions are often asked to check the level of understanding of the entire class. It can be rationalized that the greater the number of students that raise their hands to respond, the greater the number of students who understand the concept. If only a few students raise their hands, the instructor may wish to revisit the topic.

At times the instructor may wish to direct a question to a particular student. This may be done to better control and distribute discussion among students, to elicit participation from a particular student, to check a particular student's level of understanding, to reward and/or motivate a student, or to challenge particular students to think beyond simple recall. An example of a directed question might be, "John, What is meant by a complete flower?" The instructor may also want to ask the question and then call the name of the student. This is also an example of a directed question. By contrast, the question could be asked of the entire class and the instructor choose from among those who volunteer to answer. This technique is referred to as asking a general question.

## Maximizing Student Participation

Goodwin, et al. (1992) offer the following suggestions to help maximize student participation:

- Call students by their names as opposed to pointing in their general direction.

- Rather than calling on volunteers, ask questions of the entire class and try to encourage all students to participate.

- Call on specific students to answer questions. Phrase a question first, and then call on a student. If you call the student's name first, the rest of the class may not listen to the question.

- Randomly select students to respond. Do not to follow any set pattern when calling on students. For example, if you call on each student in a row, students learn to listen only when it is close to their turn to answer.

- Try to avoid repeating all student responses. Teacher repetition causes students to learn to listen to you, not their fellow students.

- Beware of the student who dominates in class by asking or answering all the questions. Try to encourage other students to respond by suggesting others volunteer or by calling on non-volunteers.

- Give students an opportunity to ask questions. Do not use "*Are there any questions?*" as your only form of feedback from students.

- Avoid asking all questions at the end of the session. If a student was lost at the beginning, the student has missed an entire session by the time the instructor has asked a question. Students may also be less willing to answer at the end of the session as they are getting ready to leave.

- Avoid looking down at notes after asking a question. You should be looking for volunteers and noting confusion or understanding of students.

- Your nonverbal reactions should complement your verbal responses. For example, it is usually ineffective to say "*good point*" while looking away or reading notes.

## Wait Time

The amount of time an instructor pauses between asking a question and soliciting an answer from a student is referred to as the *wait time*.

Whereas instructors generally wait less than a second to solicit a response, research indicates that students need at least three seconds to comprehend a question, consider the available information, formulate an answer, and begin to respond. The maximum amount of time an instructor should wait for a response is 5–7 seconds. A longer period often has a negative impact on student response and is detrimental to student interaction. The exact amount of time that is needed depends in part upon the level of question the instructor asks and upon student familiarity with content and past experience with the thought process required. As a general rule, lower-level questions require less wait time, whereas higher-level questions may require more (Goodwin, et al., 1992).

## Handling Student Responses

When an instructor asks a question, students have several options. They can respond with the anticipated answer, respond with an unanticipated answer, ask a question of the instructor, or give no response at all. Depending upon how the student reacts, the instructor may take one of several actions. Goodwin et al. (1992) suggested that instructors should reinforce the student response, probe for further information, refocus the question, redirect the question to another student, or rephrase the question for the same student. Following is an explanation of each strategy.

*Reinforcement.* The instructor can reinforce by making positive statements or by using positive nonverbal communication. Proper nonverbal responses include smiling, nodding, and maintaining eye contact. Instructors may want to provide more reinforcement to a student who has never responded in class, or to one who offers an exceptional answer, than to someone who responds often. Instructors

should not, however, overuse reinforcement by overly praising every student comment.

*Probe.* The initial response of students may be superficial. If so, the instructor needs to probe the response by asking the student explanatory questions to explore initial comments.

*Adjust/Refocus.* When a student provides a response which appears out of context, the instructor can refocus the discussion to encourage the student to tie the response to the content being discussed. This technique is also used to shift attention to a new topic.

*Redirect.* When a student responds to a question, the instructor can ask another student to comment on the statement, or get more information on the topic from another student. This strategy can also be used to allow a student to correct another student's incorrect statement or respond to another student's question.

*Rephrasing.* The instructor may wish either to assist a student in understanding a question, or to solicit a more correct response by trying one of three strategies.

> 1. Rephrase or reword the question to make it clearer.
> 2. Provide additional information to help students come up with the answer.
> 3. Break the question down into more manageable parts.

## Responding to Student Questions

When students ask questions of the instructor, there are several options for responding. It is impractical for the instructor to know the answer to every student question, and even if the answer is known, the greatest amount of learning may be attained by the instructor handling the question in a manner that does not require the instructor give the answer. Still, that remains an option, however. Goodwin, et al. (1992) suggested several strategies for handling student questions, each of which begin with one prerequisite – *Listen to the student's question*. After the instructor is sure that both he/she and the rest of the class understand the question, one or more of the following strategies may be used:

1. **The instructor answers the question.** This strategy may be the best to use if time is short, but it limits the amount of discussion by students.

2. **Redirect the question to the rest of the class.** This strategy allows students to be involved in the solution, encourages participation, and lessons the dependence upon the instructor as the only source of information in the classroom.

3. **Help the student answer his/her own question.** Often, students do not realize how much they actually know. This strategy is useful in helping students recall information that may be transferred to the context of the question being asked. The instructor may be able to ask several lower-level or recall questions to guide the student in formulating the response. Care should be taken, however, that this technique does not make the student feel embarrassed for not having already made the connection.

4. **Ask the student to see you after class for the answer.** Some questions may not be of interest to the rest of the class. These questions should not be ignored, but may be answered on an individual basis when valuable class time for the remaining students is not used on a question of which they are not interested.

5. **Defer the question to a more appropriate time.** Sometimes a question is asked at a premature point in class. That is, the instructor may be intending to discuss that point later. It is a good strategy in this case to defer the question to that point in the class period. Care should be taken to not forget the question when that time arrives, however.

6. **Refer the student to a resource where he/she may find the answer.** Be careful to not "punish" the student, however, by requiring them to do more work for just asking a question.

7. **Admit that you do not know the answer and list the strategy you will follow to answer the question**, such as:

a) You will find the answer and report back to the class tomorrow.

b) Assign another student(s) to find the answer.

or c) Ask students to develop a strategy for finding the answer.

Successful questioning strategies are important tools that instructors keep and use in their teaching toolboxes. The ability to assess students' levels of understanding, develop interest, establish relationships between concepts, and develop student thinking skills is key to successful teaching.

# References

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**Table 1.** *Bloom's Taxonomy Question Guide\**

| QUESTIONING CATEGORY | BLOOM'S CATEGORY | STUDENT ACTIVITY | TYPICAL STEM WORDS |
|---|---|---|---|
| **LOWER LEVEL** | Knowledge | Retrieve relevant knowledge from long-term memory.<br>• Recognizing<br>• Recalling<br>1. Facts<br>2. Terms<br>3. Definitions<br>4. Concepts<br>5. Principles | What<br>List<br>Name<br>Define<br>Describe |
| | Comprehension | Understanding the meaning of material, including oral, written, and graphic communication.<br>• Interpreting<br>• Exemplifying<br>• Classifying<br>• Summarizing<br>• Inferring<br>• Comparing<br>• Explaining | Paraphrase<br>Give examples of<br>Classify<br>Write<br>Infer<br>Compare<br>Explain |
| | Application | Carry out or use a procedure in a given situation. Selecting a concept or skill and using it to solve a problem.<br>• Executing<br>• Implementing | Compute<br>Solve<br>Apply<br>Modify<br>Construct |
| **HIGHER LEVEL** | Analysis | Breaking material down into its parts and determine how parts relate to one another and to an overall structure or purpose.<br>• Differentiating<br>• Organizing<br>• Attributing | Distinguish between<br>Structure<br>Determine |
| | Evaluation | Making a judgment based upon criteria and standards.<br>• Checking<br>• Critiquing | Determine<br>Judge |
| | Synthesis | Put elements together to form a coherent or functional whole; reorganize elements into a new pattern.<br>• Generating<br>• Planning<br>• Producing | Generate<br>Plan<br>Build<br>Design<br>Predict |

\*Adapted from *Effective Classroom Questioning.* Goodwin, S.S., Sharp, G.W., Cloutier, E.F., Diamond, N.A., & Dalgaard, K.A. (1992). University of Illinois-Urbana: Office of Instructional and Management Services.