Questioning Techniques: Research-Based Strategies for Teachers

Questioning techniques are a heavily used, and thus widely researched, teaching strategy. Research indicates that asking questions is second only to lecturing. Teachers typically spend anywhere from 35 to 50 percent of their instructional time asking questions. But are these questions effective in raising student achievement? How can teachers ask better questions of their students? How can current educational research inform practice?

WHY ASK QUESTIONS?

Teachers ask questions for a variety of purposes, including:

- To actively involve students in the lesson
- To increase motivation or interest
- To evaluate students' preparation
- To check on completion of work
- To develop critical thinking skills
- To review previous lessons
- To nurture insights
- To assess achievement or mastery of goals and objectives
- To stimulate independent learning

A teacher may vary his or her purpose in asking questions during a single lesson, or a single question may have more than one purpose.

In general, research shows that instruction involving questioning is more effective than instruction without questioning. Questioning is one of the nine research-based strategies presented in *Classroom Instruction That Works* (Marzano, Pickering, and Pollock 2001).

One important finding is that questions that focus student attention on important elements of a lesson result in better comprehension than those that focus on unusual or interesting elements. Questions should also be structured so that most elicit correct responses.

TYPES OF QUESTIONS

Educators have traditionally classified questions according to Bloom's Taxonomy, a hierarchy of increasingly complex intellectual skills. Bloom's Taxonomy includes six categories:

- Knowledge – recall data or information
- Comprehension – understand meaning

- Application – use a concept in a new situation
- Analysis – separate concepts into parts; distinguish between facts and inferences
- Synthesis – combine parts to form new meaning
- Evaluation – make judgments about the value of ideas or products

Some researchers have simplified classification of questions into lower and higher cognitive questions. *Lower cognitive questions* (fact, closed, direct, recall, and knowledge questions) involve the recall of information. *Higher cognitive questions* (open-ended, interpretive, evaluative, inquiry, inferential, and synthesis questions) involve the mental manipulation of information to produce or support an answer.

Regardless of the classification, traditional wisdom holds that the higher cognitive questions lead to higher-quality answers and increased learning and achievement. However, the research has mixed conclusions in this area. Some studies found that higher level questions did indeed produce deeper learning, while others found that not to be the case.

According to some studies, lower cognitive questions (knowledge and comprehension on Bloom's Taxonomy) may be most beneficial for primary students. Lower cognitive questions are also more effective when the goal is to impart factual knowledge and commit it to memory.

This finding does not mean that primary teachers should avoid all higher cognitive questions. Certainly, primary students need to have chances to speculate, imagine, and manipulate the information being presented. Some research, however, suggests that for these youngest students, these questions should be used more sparingly.

Higher cognitive questions (application, analysis, synthesis, and evaluation) should make up a higher percentage of questions asked above the primary grades. Studies show that a combination of lower and higher questions is more effective than the exclusive use of one or the other. Increasing the use of higher cognitive questions can produce superior learning gains for older students, particularly those in secondary school, and does not reduce student performance on lower cognitive questions.

It is important to note, though, that simply asking these kinds of questions does not guarantee higher responses or greater learning gains. Students need explicit instruction in answering these types of questions, including making inferences. This instruction, in conjunction with the use of higher cognitive questions, can positively impact student achievement.

The use of a high frequency (50 percent or more) of higher cognitive questions with older students is positively related to increases in on-task behavior, length of student responses, the number of relevant contributions, the number of student-to-student interactions, student use of complete sentences, speculative thinking, and relevant questions posed by students.

HOW MANY QUESTIONS? WHEN?

How many questions should a teacher ask? And at what point during the lesson? Frequent questioning has been shown to be positively related to learning facts, but simply asking a greater number of questions does not facilitate the learning of more complex material. Just as with higher cognitive questions, it may be necessary to include explicit instruction to promote student learning of complicated concepts.

Teachers often pose questions prior to reading. Research shows that while this strategy is effective for older students, those with high ability, and those interested in the subject matter, it is not as effective for younger students and poor readers, who tend to focus only on the material that will help them answer the questions.

WAIT-TIME

Wait-time is another crucial factor in questioning techniques. Wait-time can be defined as the amount of time a teacher allows to elapse after he or she has posed a question. (A less frequently used and researched definition is the amount of time that a teacher allows to elapse before responding after a student stops speaking.) While traditional wisdom advocates a brisk pace of instruction to maintain interest and cover more material, research shows that slowing slightly to include more wait-time promotes achievement.

In the classrooms studied, the average wait-time after a question was posed was one second or less. Students perceived as slow or poor learners were afforded less wait-time than students viewed as more capable. This amount of wait-time is not sufficient for students, particularly for those that experience difficulty.

Studies show that for lower cognitive questions, a wait-time of three seconds is most effective in terms of achievement. Shorter or longer times were less positively correlated with student success.

For higher cognitive questions, no wait-time threshold was observed. Researchers noted that students seemed to become more engaged and successful the longer the teacher waited (within reason, of course).

Increased wait-time is related to a number of student outcomes, including improved achievement and retention, greater numbers of higher cognitive responses, longer responses, decreases in interruptions, and increased student-student interactions. These outcomes are quite similar to those observed with an increased frequency of higher cognitive questions. In fact, researchers believe that a causal relationship may exist between the two: higher cognitive questions require more wait-time, and more wait-time allows for the implementation of higher cognitive discussions.

FEEDBACK: REDIRECTING, PROBING, AND RESPONDING

A teacher's response to students' answers is just as important as the question asked. A response may redirect students when an incorrect answer is given or students misinterpret the question. Teachers may probe for further explanation when a partial answer is given. Finally, teachers may validate a correct response.

Research in this area shows that redirection and probing are effective when they are explicitly focused on student responses. Vague or critical feedback (such as "That's not right, try again") has been shown to be unrelated to achievement.

Acknowledging correct responses is necessary and effective. Praise that is used sparingly, is directly related to the response, and is sincere and credible is also positively related to student achievement.

IN CONCLUSION

How can teachers make use of these findings? Teachers often have little or no training in questioning techniques, so being familiar with the research is a good place to start. Improving in this area requires a reflective and metacognitive approach. For example, teachers may choose to:

- Plan and write out the questions to be used in a lesson. How many are lower cognitive questions? Higher cognitive questions? Is the percentage appropriate for the age and ability level of your students?
- Anticipate possible student responses, especially partially correct or incorrect ones. How will you probe for further information or redirect?
- Ask a colleague to observe a lesson, paying particular attention to the types of questions and student responses. Meet to discuss the observations and plan for improvement.
- Videotape yourself teaching a lesson. When you watch, record your wait-time for each question. Also note if you provide longer wait-times to certain students. Or examine your feedback. Are you specific and focused on the students' responses?
- Seek out resources and professional development that can help you improve your questioning techniques. If possible, start a study group with colleagues.