

Improve Your Verbal Questioning

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Most teachers are well aware that verbal questioning can aid student learning. Asking questions can stimulate students to think about the content being studied (Carlson 1997; Good and Brophy 2000; Graesser and Person 1994; Wilen 2004; Wilen 2001), connect it to prior knowledge (Good and Brophy 2000; Graesser and Person 1994; Wilen 2001), consider its meanings and implications (Carlson 1997; Good and Brophy 2000; Graesser and Person 1994; Seymour and Osana 2003; Wilen 2004), and explore its applications (Carlson 1997; Good and Brophy 2000; Graesser and Person 1994; Wilen 2001). Researchers have found that teachers ask about 300–400 questions per day (Levin and Long 1981), and depending on the type of lesson, as many as 120 questions per hour (Carlson 1991; Carlson 1997; Graesser and Person 1994). With teachers asking this many questions, it is essential that they be skilled in using verbal questioning. Unfortunately, research on teachers' use of verbal questioning has shown that this skill is typically less effective than it could be (Anderson and Burns 1989; Dantonio 1990; Graesser and Person 1994; Seymour and Osana 2003).

A common problem with many teachers' use of verbal questioning is a lack of knowledge about questioning taxonomies and sequencing, knowledge essential for productive verbal questioning (Barnes 1979; Good and Brophy 2000; Lucking 1978; Pollack 1988; Rice 1977; Wilen 2001). Without an understanding of the different cognitive levels of questions, teachers could quite possibly be asking questions at only one or two cognitive levels, probably asking low cognitive level questions that require students to merely recall knowledge or information, rather than asking high cognitive level questions that require students to perform higher order thinking (see Martin 1979; Redfield and Rousseau 1981; Wilen and Clegg 1986; Wilen

2001; Wimer et al. 2001). Without an understanding of the sequence to ask questions, delivery techniques such as the use of wait time, prompting, probing, and refocusing become less effective. And if the questions are poorly worded or the sequence is haphazard, even skillfully used delivery techniques will not prevent student confusion and frustration (Good and Brophy 2000). This article will begin by comparing different question taxonomies, recognizing the importance of knowing the right question to ask and when to ask it, as well as understanding that verbal questioning is a skill that must be practiced before it can be effectively used. Next, it will review relevant research on question sequencing and patterns. Finally, it will present an activity using colleague classroom observations to improve teachers' verbal question sequencing.

Question Taxonomies

Taxonomies are human constructs used to classify questions based on the intellectual behavior or mental activity needed to formulate an answer (Morgan and Schreiber 1969). They are very similar to a continuum. Questions that may have only one "correct" answer and require only minimal mental activity are at one end of the continuum. More complex questions requiring greater mental activity are at the other end of the continuum.

Arguably, the most well-known question taxonomy was created by Benjamin Bloom and his associates—known formally as Bloom's Taxonomy of the Cognitive Domain, or more commonly, Bloom's Taxonomy. Bloom's Taxonomy is comprised of six levels of intellectual behavior (Bloom 1956).

1. *Knowledge*. The knowledge level is the lowest level. At this level, students are only asked to recall information.

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2. *Comprehension*. At the comprehension level, students are asked only to put information in another form.

3. *Application*. At this level, students are asked to apply known facts, principles, and/or generalizations to solve a problem.

4. *Analysis*. A question at the analysis level asks students to identify and comprehend elements of a process, communication, or series of events.

5. *Synthesis*. At this level, students are asked to engage in original creative thinking.

6. *Evaluation*. This is the highest questioning level. Students are asked to determine how closely a concept or idea is consistent with standards or values.

Bloom's Taxonomy is just one of a number of questioning taxonomies. Table 1 compares Bloom's Taxonomy with the questioning taxonomies of Krathwohl (2002) and Gallagher and Ascher (1963).

As shown in table 1, Krathwohl's Taxonomy, sometimes referred to as "the revised Bloom's Taxonomy" or simply "the revised Taxonomy" (see Airasian and Miranda 2002; Byrd 2002; Krathwohl 2002), uses the same number of categories as Bloom's Taxonomy, but there are some differences. Knowledge, the first category in Bloom's Taxonomy, was renamed Remember, and Comprehension was renamed Understand. These category changes do not reflect a difference in the cognitive level of the questions between the two taxonomies, but in their description. The terms "Remember" and "Understand" were chosen because they are commonly used by teachers to describe their work (Krathwohl 2002). For example, a question from the Remember category would be, "What is a noun?" An

example of a question from the Understand category is, "What is another way of stating the results of your experiment?" Of the remaining categories, Application, Analysis, and Evaluation were changed to Apply, Analyze, and Evaluate. And finally, Synthesis switched places with Evaluation and was renamed Create.

Gallagher and Ascher (1963) use memory, and three different types of thinking, to describe the question levels in their taxonomy. The lowest question level is Cognitive-Memory. A Cognitive-Memory question only requires simple processes such as recognition, rote memory, and selective recall. For example, "What do you call the angle of elevation of a roof?" Convergent Thinking is the next level, and is a combination of Bloom's Application and Analysis levels. It is convergent because there is only one expected answer, but it requires an analysis and integration of given or remembered data. An example from this category would be, "How would you sum up in one sentence why the main character decided to leave home?" Divergent Thinking, the next level in this taxonomy, requires using independently generated data or a new direction or perspective on a given topic. For example, "Suppose the United States had won the Vietnam War. What impact would that have on foreign policy in Southeast Asia?" Evaluative Thinking is the highest level in this taxonomy. This level requires dealing with matters of judgment, value, and choice. An example from this category would be, "Should an applicant's race be a factor in college admissions decisions? Explain."

Question Sequencing and Patterns

Being a skillful questioner requires not only an understanding of the cognitive levels of individual questions, but also an understanding of question sequencing and patterns (Barnes 1979; Good and Brophy 2000). Question sequencing is a series of questions designed so that each question builds on the answer to the previous one (Wragg and Brown 2001). Wragg and Brown analyzed more than a thousand questions asked by teachers during classroom discussions. They found that 53 percent of questions stood alone and 47 percent were part of a sequence of two or more questions. But of the questions that were part of a sequence, only 10 percent were part of a sequence of more than four questions (Wragg and Brown 2001).

Researchers have noted six patterns of questions (Brown and Edmondson 1989; Good and Brophy 2000; Taba 1971; Wilen and White 1991; Wilen 2001; Wragg and Brown 2001). The first pattern is called extending and lifting (Taba 1971). This questioning pattern involves asking a number of questions at the same cognitive level, or extending, before lifting the level of questions to the next higher level. For example, a science teacher reviewing a chapter on cell division could ask the following series of questions: "What four

TABLE 1. Comparison of Different Questioning Taxonomies

Bloom	Krathwohl	Gallagher and Ascher
Knowledge	Remember	Cognitive-memory
Comprehension	Understand	Convergent thinking
Application	Apply	
Analysis	Analyze	Divergent thinking
Synthesis	Evaluate	
Evaluation	Create	Evaluative thinking

Sources. Airasian, P. W., K. A. Cruikshank, R. E. Mayer, P. R. Pintrich, J. Raths, and M. C. Wittrock. 2001. *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Ed. L. W. Anderson and D. R. Krathwohl. New York: Longman. Bloom, B. S. 1956. *Taxonomy of educational objectives, handbook I: Cognitive domain*. New York: David McKay. Gallagher, J. J., and M. J. Ascher. 1963. A preliminary report on analyses of classroom interaction. *Merrill-Palmer Quarterly* 9 (1): 183-94.

events must occur in order for any cell to divide?" "What is mitosis?" "What are the five phase of mitosis division?" "What is meiosis?" "What are the five phases of meiotic division?" "How is cell division different in prokaryotic cells and eukaryotic cells?" In this pattern, the first five questions are all at the same cognitive level—extending. Finally, the sixth question requires students to think at a higher level to answer.

The circular path is the second questioning pattern (Brown and Edmondson 1989). This pattern involves asking a series of questions that eventually lead back to the initial position or question. A humorous example of this pattern begins with the question, "Which came first, the chicken or the egg?" After a number of subsequent questions based on responses, the discussion will inevitably lead back to the initial question—a circular path.

The third pattern is called same path, or extending (Brown and Edmondson 1989). This involves asking questions all at the same cognitive level. For example, a teacher questioning students about the sun and the energy it produces could ask the following: "How far away is the sun from the earth?" "What is the temperature of the sun in degrees Fahrenheit?" "What is the diameter of the sun in miles?" "What is the process that causes the sun to release energy as light and heat?" "How does the energy of the sun reach the earth?" This pattern uses all lower level, specific questions.

Narrow to broad is the fourth questioning pattern (Brown and Edmondson 1989; Good and Brophy 2000; Taba 1971; Wilen and White 1991; Wilen 2001). This pattern involves asking lower level, specific questions followed by higher level, general questions. For example, a history teacher discussing the American Revolution could ask the following series of questions: "Why is there a statue of Benedict Arnold's boot in Saratoga, New York?" "Why was the Battle of Saratoga considered a major turning point in the American Revolutionary War?" "Why did 'Americans' feel a revolution was necessary?" "Should rights be given or earned? Explain." In this pattern, the questions start with a lower level, specific question, and progress to higher level, general questions.

The fifth questioning pattern is called broad to narrow, or funneling (Brown and Edmondson 1989; Good and Brophy 2000; Wilen and White 1991, Wilen 2001). This question sequence begins with low level, general questions followed by higher level, specific questions. For example, a teacher could ask the following questions about ecology and the environment: "What is ecology?" "What are ecosystems?" "What are some ways ecosystems can change due to nature?" "Explain how 'succession' affects an ecosystem." "How did Rachel Carson's *Silent Spring* impact perceptions about the relationship between environment and ecosystem?" This pattern, the exact oppo-

site of the narrow to broad questioning pattern, begins with low level, general questions followed by increasingly higher level, specific questions.

The last questioning pattern is called a backbone of questions with relevant digressions (Brown and Edmondson 1989). In this sequence, the focus is not on the cognitive level of the questions but on how closely they relate to the central theme, issue, or subject of the discussion. For example, in a lesson on creative writing and imagery, an English teacher could ask the following sequence of questions about a television commercial: "Who is being targeted?" "What kind of lifestyle is presented?" "How old are the characters?" "What is the literal meaning of the message?" "What is the underlying message?" "How does the way the characters are dressed add to the message?" "If you could create another commercial about this subject, what would you say and how would you say it?" The focus of this pattern has nothing to do with the cognitive level of the questions but how they relate to the theme of script writing and imagery in a television commercial.

Colleague Classroom Observations

Obviously, merely understanding the cognitive level of individual questions and question sequencing and patterns will not, by themselves, make teachers skilled in using verbal questioning. The key to developing and mastering any skill is practicing. Teachers must use their knowledge of cognitive levels of individual questions to practice question sequencing and patterns.

An effective activity to help teachers develop verbal questioning skills is colleague classroom observations. Working in pairs, teachers observe their partner, as well as are observed, leading classroom discussions. A classroom observation instrument (see figure 1) adapted from Sadker and Sadker (1997) can be used to record these observations. Note that the instrument shown in figure 1 employs a traditional classroom seating configuration. For actual use, the instrument must accurately represent the seating arrangement of the classroom to be observed. The classroom observation instrument utilizes Gallagher and Ascher's (1963) questioning taxonomy because there are just enough categories in this taxonomy for even a novice observer to recognize different levels of questions without having difficulty identifying which category questions belong (see Riley 1980). For each classroom observation, the observer must identify the number of each question, the level (category) of each question asked, the student (whether volunteering or non-volunteering) who answered the question, and the question sequence used. For instance, if the first question asked was a cognitive-memory question answered by a volunteering student, the observer would write "1CMV" in the space on the instrument that corresponds to where the student who answered the question sat. If the next ques-

tion was a convergent thinking question answered by a non-volunteering student, it would be labeled "2CTN." Once question sequences are recognized, they are also labeled. For example, if the first question sequence was funneling, it would be labeled "1F." At a pre-observation conference, a review can be made of

questions that will be asked during the lesson, otherwise known as a question script. After the lesson, during a post-observation conference, a completed classroom observation instrument can provide valuable feedback on the cognitive level of individual questions asked and question sequences used.

Teacher's Name _____ Date _____

Observer's Name _____ Date _____

Front of Room

Symbols for this observation:

<u>Question Cognitive Level</u>	<u>Question Sequence</u>
CM = Cognitive-memory question	EL = Extending and lifting
CT = Convergent thinking question	CP = Circular path
DT = Divergent thinking question	SP = Same path
ET = Evaluative thinking question	NB = Narrow to broad
N = Non-volunteering student	F = Funneling
V = Volunteering student	B = Backbone

FIGURE 1. Classroom observation instrument.

I have used this activity for the past six years with a number of colleagues. At first glance, it seems like a very demanding and intimidating activity. The teacher being observed must write out, or at least accurately describe, the individual questions and question sequences they will be using during the observation. The teacher doing the observing is responsible for keeping track of the number of questions asked, making a quick judgment on the cognitive level of each question, locating who answered the question and if they volunteered the answer, and recognizing the question pattern used—things that only someone confident in their ability to recognize cognitive levels and patterns would feel comfortable doing. But a lot can and should be done during the pre-observation conference to alleviate any apprehension about participating in the activity. For instance, colleagues can agree on a “formal” observation for a limited number of question patterns. This allows the teacher being observed not to have to write or describe all the questions they plan to ask during the observation. This also allows the observer, after the agreed-on number of question patterns have been completed, to listen and ideally recognize cognitive levels of questions and question patterns without feeling compelled to write it all out. Sometimes, observations made during this time lead to wonderful post-observation discussions.

Speaking of post-observation discussions, there are a number of topics a new team can focus on to begin their post-observation conference. The first topic has to do with the use of a question script. A discussion about this topic usually can be started by asking questions such as: Did the question script work as planned? Was there a need to ask more questions than originally scripted? Were students able to follow your line of questioning? Why or why not? Often, answers include an acknowledgment that a few more questions were needed than anticipated. Sometimes, this can lead to a discussion about the cognitive level of questions students seem to respond to the best and possible reasons why. Another interesting topic is question transition—whether it is question level to another question level, or question sequence to another question sequence. This discussion could begin with a question such as: Was the transition from ____ to ____ as smooth as you anticipated? Why or why not? Finally, a discussion about question sequences is another good way to begin a post-observation conference. In many instances a teacher may have only used one or two types of question sequences during the observation—question sequences the teacher often used in the past. In this situation, the discussion should focus on getting the teacher out of his or her “comfort zone” and trying other question sequences. Remember, practice builds confidence and competence.

Conclusion

Asking questions and leading classroom discussions can have a positive impact on student learning. They can monitor student comprehension, help make connections to prior knowledge, and stimulate cognitive growth. But good questions and classroom discussions don't just happen. Verbal questioning is a skill, and like any skill, it must be practiced before it is mastered. It is hoped that this knowledge about sequencing and patterns, as well as the classroom observation activity, will help teachers become skilled in using verbal questioning effectively and productively.

Key words: verbal questioning, taxonomies, sequencing

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