



Reading Horizons: A Journal of Literacy and Language Arts

Volume 33
Issue 1 *September/October 1992*

Article 2

10-1-1992

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Recommended Citation

Thomas, B. B. (1992). How Can We Use What We Know About Questioning Skills to Develop Literate Thinkers?. *Reading Horizons: A Journal of Literacy and Language Arts*, 33 (1). Retrieved from https://scholarworks.wmich.edu/reading_horizons/vol33/iss1/2

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How Can We Use What We Know About Questioning Skills to Develop Literate Thinkers?

Bonnie B. Thomas

As the critical thinking movement has developed and corresponding research has been reported, a wide body of knowledge has developed around the skill of questioning as a means of developing critical thinking. Effective teachers from Socrates to the present day have sought to do more than transmit facts to students. Teachers have tried to help students develop skills in problem-solving, analyzing, evaluating and interpreting information. A typical teacher does this by asking hundreds of questions on a given day. The prevalence of this type of teaching has been found in reviews of research on teachers' questions which include studies going back to the turn of the century (Gall, 1984).

In recent years the questioning skills of teachers have come under close scrutiny and wholesale criticism. The purposes of this article are to present a review of the research on questioning skills and to discuss possible reasons why these skills are not being used in the classroom as often as they should or could be used. Various questioning strategies are explored and ideas are offered about how these strategies can be used in the classroom to reach beyond the teacher's manuals to develop higher quality student thinking.

What we know about questioning

There has been sufficient research about questioning skills to establish a knowledge base which provides evidence that teacher questioning contributes significantly to student learning (Costa, 1985; Dantonio, 1990). We know, for instance, that teachers consider questioning, particularly higher order questions, to be highly important (Rosales, 1990), that teachers can structure educational environments which encourage students to question, which encourage risk-taking, and which model good questioning procedures; that this, in turn, fosters cognitive activity on higher levels within this environment. We know that there is a relationship between the level of questions and the syntax used by the teacher, and the quality of responses from the students. Probing student answers with appropriate response questions is also an effective questioning procedure resulting in greater depth in student responses.

Knowing this, why is it that teachers and students alike persist in using factual questions requiring little intellectual effort beyond memory? There are several reasons why teachers and students do not take the role of questioning as a serious part of the educational program, not the least of which are the testing procedures used in virtually all schools. A vast majority of standardized tests ask for responses that require memorization and recall, neglecting the higher thinking processes. Because they tend to be textbook oriented, many teachers emphasize the factual, low level questions found in the basal readers. The questions in these readers are often remarkably deficient in their attention to thinking. Although many teachers are frustrated by the script-type orientation of teacher's manuals which emphasize mastery of facts, they believe that in order for their students to perform well on the unit tests, which also emphasize knowledge level thinking, they

must themselves emphasize that level of questioning. Unfortunately, teacher-made tests often follow the same pattern, leading students to the notion that they need only attend to those concepts or items on which they will be tested. Moreover, teachers often indicate their preservice programs do not adequately prepare them for encouraging or appraising critical thinking.

The use of factual level questions has some merit, however. Studies have shown that teaching emphasizing factual questions about subject matter results in higher achievement when the achievement measures are based on answering factual questions about the subject (Gall, 1984; Strother, 1989).

In spite of the proliferation of tests and testing procedures, there has been a surge of interest in thinking skills since the mid 1980s. One reason for this is the influence of educational reports which came out in the early 1980s expressing concern about the readiness of our youth to enter adult life with an ability to reason. Another factor is the influence of corporate America through books dealing with the future of industry. This literature has emphasized the advantages possessed by students who are skilled in problem-solving, decision-making and creative thinking, and the need industry and business has for workers who can master changes that come with living in an information society (Pauker, 1987).

Educators are thus caught in a double bind. While on the one hand they are expected to produce critical thinkers who are comfortable with the processes of problem solving, creative thinking and methods of inquiry, at the same time their students must produce high achievement test scores, which is ordinarily an outgrowth of teacher-centered

strategies and fact-laden questions. Instead of putting teachers in this awkward position, thinking should be installed as a valid goal for education. Educators need to synchronize curriculum, staff development, instructional materials, evaluation measures, supervision practices and communication with parents to focus on this common goal.

In the absence of a district-wide thinking skills program, teachers who wish to do so can develop the skills necessary to improve their students' thinking by improving their own questioning techniques and developing their students' questioning techniques.

Questioning strategies for the teacher

Asking thought-provoking questions seems to come naturally for a few fortunate teachers. However, the great majority of us must learn the skill by practice and feedback. Until teachers have practiced questioning techniques and have been provided consistent feedback on the quality of their questions, they should write down the questions they plan to ask. Costa (1985) and Dantonio (1990) have developed questioning strategies that have merit, are applicable in the generic sense, and are easily adapted to lesson plans across the curriculum.

In his model of intellectual functioning, Costa (1985) describes three phases: input, processing and output. He maintains that there are appropriate questions that can be asked during each of these phases that cause students to think. By carefully constructing questions, teachers can design lessons which cause the students to perform intellectual functions appropriate for each of the phases.

Questions at the input phase would of necessity be generally factual. These are commonly found in teacher's

manuals and are easily developed by teachers. A simple list of the action words describing cognitive behavior at the input phase to prompt the teacher would insure appropriate questions at the input stage. Costa suggests these words: *counting, matching, defining, observing, reciting, selecting, describing, completing, naming, listing and identifying.*

During the processing stage the teacher, through appropriate questions, can help students make sense of the data gathered during the input stage. At this stage, the questions become higher level, producing greater depth in the responses. Using a classic piece of children's literature, Frances Hodgson Burnett's *The Secret Garden* (1910, 1962), the following are examples of questions which could be asked during the processing stage: 1) How do you think Mary's uncle will feel when he finds out she has been in the secret garden? (*synthesizing*) 2) What evidence did you find that would lead Colin to believe he would have the same affliction as his father? (*analyzing*) 3) How are Mary and Colin alike? (comparing) or different? (*contrasting*) 4) List the main points of the story from the beginning to where we are now. (*sequencing*) 5) Why was Colin unable to walk at first? (*determining causality*)

Other questions may be developed using such process words as *categorizing, explaining, classifying, inferring, experimenting, organizing, distinguishing, summarizing, grouping and making analogies.*

In the final or output phase, students apply the information and evaluate the situation. Questions that might be asked about *The Secret Garden* in this phase are: 1) What do you think would have happened if Mary had never met Dickon? (*hypothesizing*) 2) If everyone took on Colin's new philosophy or "magic," what do you think it would be like?

(*speculating*) 3) In your opinion, who was the most important person in this story? Why? (*evaluating*) 4) If you were to design your own secret garden, what would it look like? (*designing*) Other questions could be developed using the words *imagining, planning, judging, predicting, extrapolating, creating, forecasting, inventing, generalizing* and *model building*.

Dantonio (1990) has also introduced two interesting types of questions which lead to increased skill in critical thinking. They are *core* questions and *processing* questions. Core questions have three characteristics: 1) clarity – the question is easy to understand; 2) focus – it identifies the content and thinking process; and 3) openness – it allows for diversity of response. Dantonio maintains that it is important to limit the number of core questions to four or five per discussion period.

Processing questions, on the other hand, are follow-up questions which give the teacher the opportunity to help learners think through and extend their original responses, giving them fuller understanding of what they have said. Gall (1970) in his earlier work suggested this same type of question sequence and went on to emphasize that the follow-up or processing questions have a substantial impact on student learning. The importance of follow-up questions is further substantiated by Hare and Pulliam (1980) who stated in their study of teacher questioning that follow-up questions to student responses were as important as the initial questions.

Dantonio goes on to suggest that teachers attempt to prepare appropriate processing questions ahead of time, if possible, by speculating on students' most likely responses. She identifies six types of process, or follow-up, questions,

and includes an example of each. *Refocusing*: You've told us how these two fables are similar; now tell us their differences. *Narrowing focus*: What do you recall about (a particular passage)? *Clarifying*: I'm not sure I understood what you said. Could you say it a different way? *Verifying*: Can you substantiate your statement? *Supporting*: What makes you think Mary will do that? *Redirecting*: Someone else tell us another possible reason for (a specific detail in the story).

Processing or follow-up questions require active listening. Teachers cannot be thinking about the next question while the student is responding, but must assess the quality of the response, decide what is missing, and only then structure the next question to elicit the appropriate information. Strategic decisions are made by teachers as they formulate follow-up questions intended to shape quality student answers.

To strengthen the quality of the response further, teachers should make students aware what higher-level thinking skills are being taught. When they do, they are more likely to have students who practice these thinking skills actively. Students respond in greater depth when they perceive that their teachers emphasize thinking skills. It is imperative, therefore, that teachers draw students' attention to the cognitive process embedded in the questions they ask, as well as point out the type of thinking used by the student in their responses. This process of identifying the thinking skill reflects the essence of current efforts to improve students' thinking (Beyer, 1988).

Linguistic precision such as that described above is also advocated by Costa and Marzano (1987) who maintain that precise language on the part of the teacher stimulates

higher level responses from students. Teachers often can be heard admonishing a student to think, without telling the student what to think about or how to think. Instead, teachers should phrase each question so it is clear which type of thinking is required. They provide examples of linguistic precision using specific cognitive terminology, shown in Figure 1.

Figure 1
Increasing linguistic precision
(adapted from Costa and Marzano, 1987, p. 30)

<i>Instead of saying</i>	<i>Say</i>
Let's look at these two pictures.	Let's <i>compare</i> these two pictures.
What do you think will happen when...	What can you <i>predict</i> will happen when...
How can you put ...into groups...	How can you <i>classify</i> ...
Let's work this problem.	Let's <i>analyze</i> this problem.
What do you think would happen if...	What do you <i>speculate</i> would happen if...
What did you think of the story?	What <i>conclusions</i> can you draw about this story?
How can you explain...	What <i>hypothesis</i> do you have that might explain...
How do you know that's true?	What <i>evidence</i> do you have to support?
How else could you use this...	How could you <i>apply</i> this...

Developing student questioning strategies

Much of the research on questioning relates to teacher questioning techniques rather than teaching students to formulate their own questions. However, when students formulate questions, they become actively involved in learning (Marzano et al., 1988). If increased thinking skill development is the goal, a teacher's ultimate challenge is to teach student strategies that support effective thinking. The most basic strategy (which, unfortunately, is not as widely

practiced as it should be) is, as has been discussed earlier, that of modeling effective, precise questioning techniques.

Another strategy is Ogle's (1986) KWL strategy which begins with teacher-generated questions, then guides students into formulating questions themselves while continuously encouraging students to be linguistically precise. Since one of the characteristics of critical thinkers is the ability to use specific terminology, teachers also need to provide both formal and informal situations where students can practice linguistic precision.

Reciprocal questioning, a technique developed by Palincsar and Brown (1984), is another strategy for teaching students to ask questions. Using this method the student and the teacher take turns asking each other questions about a passage. Together they read a paragraph and, guided by the teacher's questions, identify and integrate what is happening. When they have identified and interpreted enough information, they predict what will happen next. The teacher and student then reverse roles. After several sessions, students become adept at constructing questions of sophistication, by imitating the teacher.

An informal setting can be created by using cooperative learning groups which provide students with the opportunity to develop questioning and problem-solving techniques. Holding discussions in small cooperative learning groups creates a setting where students can consider several points of view on a topic or engage in reciprocal questioning. This dialectic discussion strategy offers opportunities to question viewpoints, question implications and consequences, comment critically, and generate new information in a less threatening environment.

One area which may be of concern to teachers is evaluation of student growth in questioning strategies. Costa (1985) describes what we might see in a classroom where thinking is encouraged. We would find a room arrangement where students can see and hear each other, where students are engaged with one another and not merely talking to the teacher, and where the teacher is the facilitator for student ideas. In this classroom the teacher models the desired questioning strategies. This teacher uses one or more of the frequently used techniques to measure growth in development of thinking and questioning strategies. For instance, the teacher may observe and record in a journal occurrences of student-student or student-teacher interactions which are later analyzed for themes or patterns. Another technique is to tape classroom discussions systematically, again analyzing them over a period of time to demonstrate evidence of change and growth.

There are no clear standards by which student questioning strategies can be measured. However, systematically collecting and analyzing data will provide information which can be measured against criteria established by the teacher or the teacher and students together for demonstrating improvement in questioning strategies.

The implications of research demonstrate that judicious structuring of questions can cause students to think more clearly, critically, and divergently. Teachers can develop the skills and procedures known to improve students' thinking until such time as district-wide thinking skills programs are put into place. They can learn to assess the level and types of questions provided in teacher's manuals and add ones which elicit answers based on higher order thinking. By eliminating some factual questions and substituting questions which require divergent thinking, teachers can

address, if not overcome, the double bind in which they find themselves.

This article has attempted to encourage teachers to improve their questioning skills by providing examples of questions designed to elicit critical thinking and providing suggestions to assess when and whether critical thinking has occurred. Asking thought-provoking questions is not easy; it takes effort, time and practice. However, one of the ultimate outcomes of education is to produce citizens who are critical processors and consumers of information and who are committed to accuracy and clarity. The use of effective questioning strategies is one widely researched procedure available to assist teachers in their efforts to be successful in this endeavor. Teachers can and must create an environment where critical thinking occurs.

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