of the teacher. Once again, it's important to remember the goal of promoting thinking. By telling the correct answer, you run the risk of having students stop their thinking. If the answer is the primary goal, students have no further reason to continue with the problem once the answer is revealed. Instead, the teacher needs to support the students' thinking. It's useful to have the students act out the problem, using slips of paper for $10 bills. It is helpful to encourage students to discuss the problem with their friends and families. Keeping mathematical exploration alive is the key.

Encouraging continued thinking may be frustrating for students. You do not want to discourage students so that they stop thinking, nor do you want to leave them with misconceptions. Making the decision not to provide an answer, but instead to keep the problem alive, is one of those judgments that teachers continually have to make. When doing so, you need to discuss your action with the students, creating an awareness of the existence and importance of mathematical thinking. This awareness needs to be nurtured consciously and continually by talking about it whenever the opportunity arises.

Final Thoughts

Teachers need to make questions of the types described a regular part of children's mathematical experience, so they come to regard these questions as a basic ingredient of their learning of mathematics. It is not enough for children merely to learn the processes of mathematics. They need to increase their understanding of what mathematics is and learn to use those processes.

It's important to remember that developing the ability to think mathematically is not a lesson objective but a long-range goal. Time is often a concern for teachers—you've got just a year to get through an enormous amount of material. Natural learning, however, doesn't happen on a schedule and often requires more time than schools are organized to provide. Discussions with questioning students take time. It's essential that teachers give the time needed for children not only to work through activities that promote thinking but also to reflect on that thinking whenever possible.

Teachers need to hold the vision of positive, open, inquiring children, who willingly explore mathematics with enthusiasm. Children's experiences in mathematics need to be exciting and fun, not in the sense of easy or trivial but in the sense of engaging them fully and keeping them involved in the investigation.

Mathematics involves a sense of investigation.

Classroom experiences must extend beyond the goal of arriving at correct answers. Children must be asked to judge the reasonableness of their thinking, to defend their solutions. Further, children's classroom experiences need to lead them to make predictions, formulate generalizations, justify their thinking, consider how ideas can be expanded or shifted, look for alternate approaches, and search for—even seek—those insights that, rather than converging toward an answer, open up new areas to investigate. Children are capable of this quality of work in school mathematics. To expect less is pointless and demeaning. Questioning is an important part of the teacher's ability to establish a classroom atmosphere conducive to the development of mathematical thinking.

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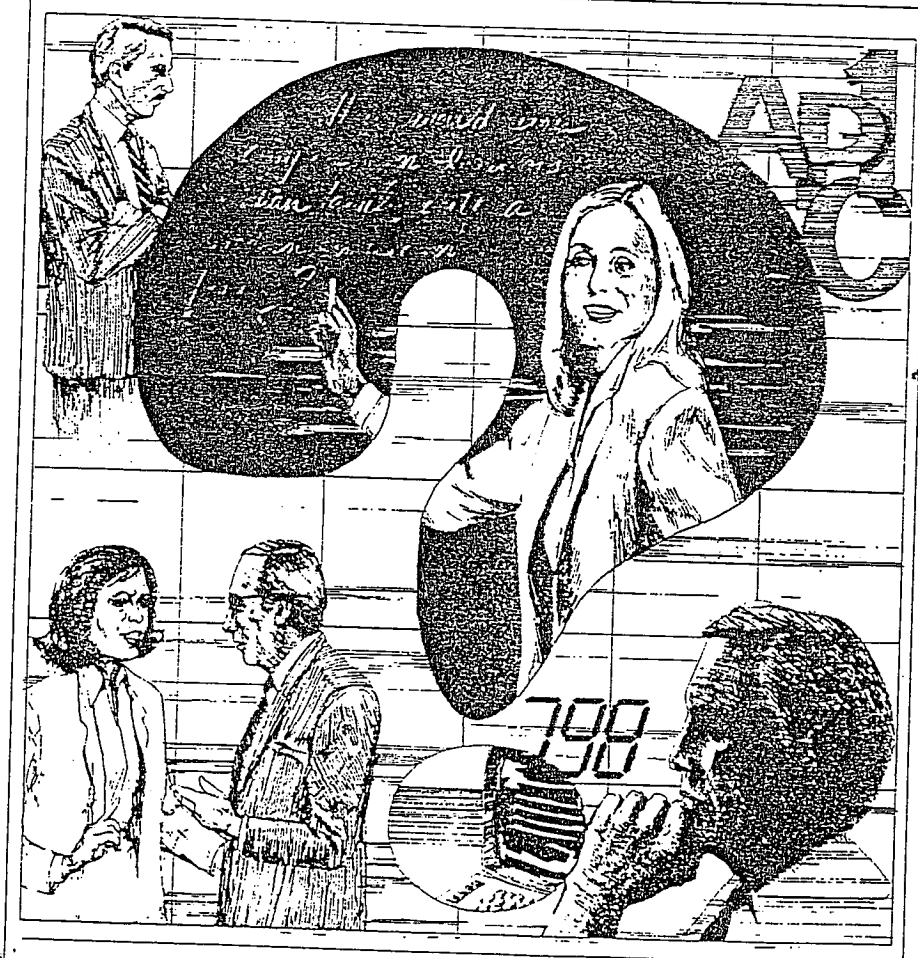
When Teachers Tackle Thinking Skills

LUCILLE FALKOF AND JANET MOSS



Asking the right questions in the right ways can prompt well-developed, detailed, and thoughtful responses from all students.

"If I could start over again, I would teach kids how to think before teaching them how to write."

It was this casual remark that spurred a group of teachers in Highland Park, Illinois, to begin research that eventually led to a districtwide thinking skills program. With financial support from the district, this nucleus of teachers initially investigated two subjects during a summer workshop: making inferences and making analogies.

There was a clearly indicated need for focusing on these two areas. Teachers noted that kindergarten children had problems making inferences from pictures. Similarly, 6th graders failed to see the humor in political cartoons because of their inability to interpret clues in the pictures and captions. The group administrator noted as well that the best teachers used analogies to help children see relationships between new ideas and concepts they already understood. We hoped to improve students' independent reasoning by helping them make these connections.

During the summer, the teachers compiled a list of source readings and worksheets on inferences and analogies. We soon discovered, however, that these materials were ineffective

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Figure 1. Making Inferences.

	Innate—but need to be made aware		*Requires some introductory teaching*		*Requires understanding of previous stages to interpret material*	
From:	Body language	Sound, silence, taste, touch, smell	Visual clues (using artifacts, pictures, symbols, cartoons, maps)	Simple written text	Complex written text	Propaganda, evaluation of text—point of view, political speech, advertisement, political cartoons

because they lacked continuity and relevance to the total learning process.

Developing a Continuum Model

What proved most valuable was an original continuum of separate skills that the teachers had identified as developmental stages in the making of inferences (see Figure 1). The kindergarten teacher in the group recognized that the practice of making inferences does not begin as we teach reading comprehension but rather in early childhood—children make inferences from body language, sounds, and visual clues long before they enter school.

To implement this continuum, workshop participants suggested strategies they were already using in their classrooms. Teachers began to see the connection between ideas they practiced regularly and a process of thinking. They also saw how strategies to help kindergarten children make inferences from body language later enabled 4th grade students to make inferences from a reading passage. For the first time, teachers could see the sequential stages necessary to develop a thinking skill.

During fall staff meetings, the summer workshop participants began to share some of these strategies with colleagues. As we worked through the strategies, we began to see the interconnection between one thinking skill and another.

Staff members agreed to use John Wyeth's painting, *Christina's World*, to see what inferences K-6 children would make from visual clues. Some teachers were more successful than others. One 1st grade teacher complained, "All I got were literal answers. The children made no inferences at all. Why, the kindergarten teacher had better responses from her children than I did from my 1st graders. I must have been asking the wrong questions."

She was. As a result, the group decided that we needed to backtrack, to learn more about questions that would raise the level of thinking from literal to interpretive.

Questions: Key Element in Thinking

While "questioning" exists in all classroom settings—in oral discussions, written assignments, and tests—current research states that 80 to 85 percent of all questions asked by teachers are on a factual level. This was something we certainly wanted to change. We felt that the starting point for stimulating student thinking skills begins with the teacher's ability to handle questioning techniques. We also felt that good teacher modeling is the first step in helping children create good questions themselves.

Once aware that the questions we posed determined the level of thinking and the quality of the response, it made sense to introduce all teachers to Bloom's Taxonomy of Educational Objectives (1969). Many teachers found the taxonomy rather complex, so we created a simplified version of question types correlated with the taxonomy and Guilford's Structure of the Intellect. The four types of questions

Figure 2. Four Types of Questions.

Question Types District #108	*Bloom's Taxonomy*	*Guilford's Structure of the Intellect*
1. Factual	Knowledge/Comprehension	Cognition/Memory
2. Interpretive	Application/Analysis	Convergent Thinking
3. Creative	Synthesis	Divergent Thinking
4. Evaluative	Evaluation	Affective, Convergent Thinking

are factual, interpretive, evaluative, and creative (see Figure 2).

Improving questioning techniques involved a three-step process:

1. Teachers needed to know the four question types and the quality of responses that resulted from each type.
2. Students needed to be able to identify and respond appropriately to each question type.
3. Students themselves needed to begin to ask better questions.

A problem arose when teachers applied higher level questioning skills to class assignments as well as discussion. Students understood that a higher level answer could not be simply repeated from the book, but they did not know how to begin developing an appropriate response.

A teacher on the thinking skills committee reported she had given her 5th grade class what she thought was an excellent assignment: "Compare the Iroquois Indian family with a modern American family." It combined higher levels of thinking with the process of essay writing. To her dismay, her students struggled, frustrated, unable to meet or even understand the expectations of their teacher. To her credit, the teacher was able to pinpoint the problem: she was asking her students higher level questions without providing them with the strategies they needed to give a good response.

We obviously needed to spend more time with the second step of our three-step questioning process. We could not ask children to answer questions requiring them to make relationships without reviewing with them the various stages of the process. Whether we used the phrase "transfer theory," "making analogies," or followed the synectics philosophy of "making connections," the point was the same. We needed to help students integrate new material with concepts already familiar to them. What evolved was an easy-to-follow, systematic approach to the process of making relationships, beginning in kindergarten and building each year through 8th grade (see Figure 3).

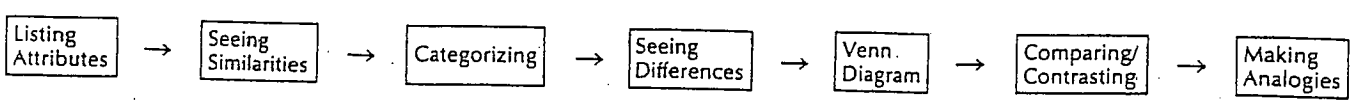
Putting the Show on the Road

We were now ready to share our information throughout the district. In one building, we tried out the continuum on inferences and the underlying strategies. We had teacher feedback on what strategies worked and how they could be adapted for various grade levels. During the second summer of planning we included teachers from other buildings and from junior high subject areas, such as science and math. Through them we were able to add new strategies to our repertoire—strategies adaptable to all subjects and all grade levels.

Last year we began a districtwide program of thinking skills, using members of the committee to lead grade-level workshops on inservice days. At each of the workshops, the leaders gave a rationale for the thinking process being taught. They helped teachers to realize that they were probably already using many of these techniques. Our goal, they explained, was to make teachers aware of how these and other strategies improve thinking and how they fit into particular curriculums.

The first workshop focused on questioning skills. In addition to providing teachers with our questioning model, we showed them how children could practice writing questions—for example, by giving children an answer and having them compose an appropriate and corresponding question. We began with factual questions, which are the easiest type and which can help children quickly learn the need to be specific and precise. From there, we moved to interpretive, creative, and evaluative questions. The more we worked with teachers and students on the four question types, the more *we* learned. We found, for instance, that (1) interpretive questions were the most effective and most frequently used to achieve higher level thinking in the content area, and (2) in order to answer the majority of interpretive questions, students needed to know how to make inferences.

Figure 3. Making Relationships/Analogies.



Thus, our next set of workshops dealt with making inferences. Teachers first worked through the continuum, and at each stage were given background theory along with practical strategies they could use immediately in their classrooms. No matter what grade level the workshop was intended for, we began with what we had learned from the kindergarten teacher who clued us into the first developmental stage of making inferences. She reminded us that children know much about inferring long before they enter kindergarten and that they enjoy using big words. They can understand and use the word "infer" provided they have experiences that teach and reinforce the concept.

Making Inferences from Sensory Clues

Each teacher was given a continuum on making inferences (see Figure 1). We began with simple strategies, such as the following:

What Is My Mood? Stand in front of the room and ask the children to guess how you are feeling as you frown, fold your arms tightly across your chest, and tighten your lips. Within moments the children will begin to use adjectives to describe your mood. The key is to ask them, "How do you know?" Children need to be able to substantiate their inferences by saying, "You are angry *because* your mouth is tight," and so on.

Making Inferences from Visual Clues

What Do I Know About This Culture? Ask students to pretend they are archeologists living 500 years from now. They uncover an American coin. What inferences might they make from the coin? (The society knew about metallurgy, had a writing and number system, probably had a government that minted the coins, and so forth.)

Making Inferences from Text. With enough practice in making inferences from visual and sensory clues, children should be able to make inferences from word clues in a sentence. With the "cloze" technique, youngsters guess a word or the meaning of a

"Children can learn to ask pertinent questions and make inferences and analogies if taught in sequential steps beginning as early as kindergarten."

"Advertising is a natural for inferential analysis; text can be interpreted from different points of view or analyzed for propaganda."

word early on in the reading process. (For a complete description of the cloze test, see Thelen, 1982). For example, "The boy tripped and, f--- into the river." Good readers, using context to infer the unfamiliar word, know it is *fell*. A good teacher will capitalize on this skill and ask children to explain *why* they picked this word. (It begins with an "f" sound; if the boy tripped, he probably *fell* into the water).

From such an inference based in the 1st and 2nd grades, we can then ask children to make inferences from a paragraph. Too often, teachers spend too much time on literal questions and do not take time to ask probing inferential questions. Lessons then become mere exercises in rote recitation of facts rather than discussions using thinking skills. Yet research supports the idea that children apparently make inferences *as* they read (Carr, 1982), not only after they have discussed the facts. We often do not give children enough credit for their innate reasoning ability.

Kathryn Carr uses the story "Stone Soup" to describe the "empty slot" technique, the next step following the "cloze" strategy. The empty slot is the unwritten information that can be inferred between one group of sentences and another. Here is Carr's example: "There once was a poor man who was lost in a bad storm. He had only a few nuts to eat that he found in the forest." (Much can be inferred about the man and his actions between these and the following sentence.) "Finally, he went to a large house to beg for food." Note the data that can be gained by asking probing questions:

1. What do we know about the man besides what is stated in the first two sentences? (He was probably hungry; he saw a large house; he had been walking through the forest.)

2. What clues tell us this? (He had only a few nuts to eat; he begged for food; he went to a large house.)

By exposing children to such paragraphs and making them aware of the clues they used to support their conclusions, we enable them to use this strategy in future lessons. As children develop greater skills in making inferences from simple contextual clues, teachers can move to more difficult and varied materials. Advertising is a natural for inferential analysis; text can be interpreted from different points of view or analyzed for propaganda. Even political cartoons require children to recognize symbols, be aware of current events, and make connections between reality and the absurd.

Making Relationships/ Analogies

Middle grade teachers often assume that children have learned how to compare and contrast—to see relationships. We have learned that making relationships requires preliminary skills. For instance, children need to conceptualize what an attribute is before they can see similarities. (The term "attributes" was chosen for continuity through the grade levels, but other terms—traits, properties, characteristics—could be used.) Once children can identify the common factor in two items, they have advanced to categorizing. It is important that children give a rationale behind their thinking, for unless we specifically point it out, most students are unaware of the thinking processes involved in formulating relationships. Children need to be consciously aware of "thinking about their thinking" (metacognition).

When they understand relationships, students are ready to tackle comparing and contrasting. Practice on the initial steps enables them to eventually succeed at making complex curriculum-based relationships and analogies. At last, our students were equipped to respond to the request, "Compare an Iroquois Indian family with a modern American family."

Taking students through this step-by-step process enables teachers to determine at exactly what point students have problems and more adequately help them. Students will eventually integrate the preliminary steps.

Not all students make this intuitive leap from lists of similarities and dif-

Teacher Professional Development

Questioning and Understanding To Improve Learning and Thinking (QUILT)

A Program Designed To Enhance Student Learning by Improving Teachers' Classroom Questioning Techniques

Developed and tested by the Appalachia Educational Laboratory (AEL)

What is the idea behind *QUILT*?

QUILT is a staff development program designed to increase students' true thinking time by helping teachers improve their classroom questioning techniques. Asking more effective classroom questions can encourage all students to think at higher cognitive levels and ask questions of their own that will ultimately lead to improved learning.

QUILT complements and supports many existing staff development programs. Schools have reported that the *QUILT* program helped pull together some diverse programs to create a better understanding of teaching and learning. AEL has had reports that *QUILT* is complementary to the following programs: TESA (Teacher Expectations and Student Achievement), Cooperative Learning, Madeline Hunter's ITIP, Integration Across the Curriculum, Dimensions of Learning, Whole Language, and Higher Order Thinking Skills.

The development of this program was truly a collaborative effort forged with the talents and energies of teachers, principals, and administrators from five school districts in Kentucky, along with the staff at AEL. The program evolved from the creativity and work of many--much like the folk tradition of a quilting bee. And similarly, the model program has spread to schools throughout Tennessee, Virginia, West Virginia, and beyond the Laboratory region.

QUILT is an intensive, year long program not bound by grade or content area. A personal commitment from participants is necessary for success with the program. Schools send an administrator and a team of teachers to national training, where they learn how to facilitate *QUILT* with their own faculty. *QUILT* has three major components:

- **Induction training**. Teachers learn about effective questioning techniques during a 3-day (18-hour) introductory training period conducted by members of a local facilitation team.
- **Collegiums**. Participants meet in seven 90-minute seminars throughout the school year to learn, share, and interact about particular questioning behaviors targeted for practice and improvement.

- **Partnering.** Teachers observe and are observed by partners six times during the year.

Elementary, middle, and junior and senior high schools have successfully implemented *QUILT*. Both large and small schools have enjoyed success with the program with faculty size ranging from 8 to more than 80 teachers. Larger faculties may require more members on the local facilitation team to be able to conduct the collegiums.

What does research say about how this idea can help teaching and learning?

Classroom questioning practice has been the focus of numerous education researchers for over 100 years. Although it is widely assumed that classroom questioning promotes student thinking and learning, research in actual classrooms indicates that current practice falls far short. Consider the following: over 40 percent of classroom instructional time is spent asking questions, and as many as 40 to 50 questions are posed in a typical 50-minute class segment. Most of these classroom questions are not well prepared and do not serve the purpose of prompting students to think. Usually questions serve the purpose of having students verbalize what has been taught. In fact, teachers do not give students time for true thinking.

Classroom studies have also shown that lower-achieving students receive fewer opportunities to answer questions than other students. On the average, teachers wait less than 1 second for a student response. This is in contrast to the findings that when teachers wait 3 to 5 seconds after asking a question, students give longer, higher-level responses; answer with more certainty in their own responses; make more inferences; and ask more questions.

Question-asking indicates that someone is curious, puzzled, and uncertain; it is a sign of being engaged in thinking about a topic. And, yet, very few students ask questions; rarely is even one student question posed in a typical class. Consistently, classroom research finds a large gap, with both students and teachers, between typical questioning and effective questioning that can affect student achievement. The *QUILT* model, which is the basic content for the program, views questioning as a complex, dynamic process governed by teacher behavior at critical junctures. The *QUILT* model has five stages:

Stage 1: Prepare the question

- Identify instructional purpose
- Determine content focus
- Select cognitive level
- Consider wording and syntax

Stage 2: Present the question

- Indicate response format
- Ask the question
- Select respondent

Stage 3: Prompt student responses

- Pause after asking question
- Assist nonrespondent

- Pause following student response

Stage 4: Process student responses

- Provide appropriate feedback
- Expand and use correct responses
- Elicit student reactions and questions

Stage 5: Critique the questioning episode

- Analyze the questions
- Map respondent selection
- Evaluate student response patterns
- Examine teacher and student reactions

Research about effective professional development for teachers is reflected in the *QUILT* model. First, the phasing of activities over an entire school year acknowledges that change is a process that occurs over time. Second, the structure is consistent with theories that teachers learn and improve performance when provided opportunities to acquire a relevant knowledge base, observe demonstrations, practice new behaviors, and receive feedback regarding performance.

How was program tested?

During 1991-92, the *QUILT* program was classroom tested in 13 school districts with more than 1,200 teachers across AEL's four-state region. At one school in each district, teachers received the complete, year long *QUILT* program beginning with a 3-day induction training, seven follow-up sessions, and teamwork with colleagues throughout the school year. Teachers at two comparison schools in each district received an abridged version of the training lasting either 3 days or 3 hours. These comparisons more closely resemble traditional staff development than does the complete *QUILT* program. At all three schools in each district, before-and-after tests measured what teachers knew about asking questions, what attitudes they held that might facilitate or impede effective asking of questions, and how they actually asked questions in class as revealed in videotapes.

From the analysis of these test data, the *QUILT* program can claim to show an increase in teacher *understanding* of effective classroom questioning and a corresponding *use* of effective questioning practices along with an increase in student thinking. As measured by coded videotapes, students in grades kindergarten through 12 answered at higher cognitive levels significantly more often after their teachers participated in the *QUILT* program. These students also asked significantly more clarifying questions than did students whose teachers were in a comparison treatment group.

What communities and states are using this program?

The power of good questioning to stimulate studentsÆ thinking has been the compelling idea contributing to the growing awareness of *QUILT* throughout the United States. *QUILT* has been implemented in schools in 13 states and 5 territories. *QUILT*'s training-of-trainers approach has been helping school districts prepare cadres of local teachers who then train others in their schools,

districts, and states. AEL staff has instructed more than 650 *QUILT* trainers who have presented the materials to about 4,600 teachers. Expectations are to add 300 to 400 teachers a year.

Sustaining features of the program exist as well, including booster conferences for local facilitators and renewal meetings for those schools involved in the second year of *QUILT*. Beyond contact with those practicing *QUILT*, the Laboratory staff members continue ongoing program analysis and discussion to improve their efforts to promote and sustain change in teaching cultures.

What's involved in using this program in my school and community?

At each school, the *QUILT* program is led by a local team of three to five members who have been trained by the Laboratory or an AEL-certified trainer. The local training team ideally includes classroom teachers and a school administrator. The Laboratory holds a national training-for-trainers session during the third week of June in Lexington, Kentucky.

The *QUILT* staff development program has been successfully implemented under a variety of circumstances. However, Laboratory staff believes that *QUILT* is most appropriate when the following factors are present:

- The school principal provides support, is committed to the program, and is actively involved in the program.
- Teachers understand the time commitment required for the program and receive appropriate incentives for participation.
- The program meets a school need identified both by school administrators and teacher participants.

Costs associated with implementing this program vary, depending on the components of the program being used.

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[Peer-Assisted Leadership (PAL)] PREV UP NEXT [Teaching Cases: New Approaches to Teacher Education and Staff Development]

Institute for Inquiry

The Art of Questioning

Wolf, Dennis Palmer. "The Art of Questioning."
Academic Connections; p1-7, Winter 1987.

[This article was originally a talk delivered at the Summer Institute of the College Boards Educational EQuality Project, held in Santa Cruz, California, July 9-13, 1986. At the institute more than one hundred high school and college teachers convened to consider how concerns raised by the education reform movement can be translated into improvements in everyday teaching practice. One topic given particularly close attention was that of questioning in the classroom. Dennie Wolfs remarks provided the keynote for these deliberations, and the version of her talk presented here has been expanded slightly to take into account questions raised by institute participants.

The observations that appear in the article come from classrooms Wolf visited while working as a consultant to the College Boards Office of Academic Affairs and as a member of a research project on assessment in the arts currently funded by the Rockefeller Foundation. She especially thanks teachers in Boston, Cambridge, Los Angeles, Pittsburgh, and St. Paul for their generous cooperation. Wolf works with Project Zero, Harvard University Graduate School of Education.]

Ask a teacher how he or she teaches and, chances are, the answer is, "By asking questions." However, if you go on and ask just how he or she uses questions or what sets apart keen, invigorating questioning from perfunctory versions, that same teacher might have a hard time replying. In itself this is no condemnation-there are many occasions when we do magnificently without explicit knowledge: Few of us can explain transformational grammar, but we can form questions, all the same. A major league pitcher is sure of dozens of algorithms for trajectory, though his theory is as much in his elbow as on the tip of his tongue.

Still, a growing body of observation and research suggests that teachers' uncertainly about how they question cannot, or should not, be explained simply as a lack of explicit knowledge. Consider several observations that have emerged from recent educational research:

There are many classrooms in which teachers rarely pose questions above the "read-it-and-repeat-it" level. Questions that demand inferential reasoning, much less hypothesis-formation or the creative transfer of information to new situations, simply do not occur with any frequency (Gall 1970; Mills, Rice, Berliner, and Rousseau 1980).

The questions and answers that do occur often take place in a bland, if not boring or bleak, intellectual landscape, where student answers meet only with responses from teachers at the "uh-huh" level. Even more sobering is the observation that teachers' questions often go nowhere. They may request the definition of a sonnet, the date of Shakespeare's birth, the meaning of the word "varlet"- but, once the reply is given, that is the end of the sequence. Extended stretches of questioning in which the information builds from facts toward insight or complex ideas rarely take place (Goodlad 1984, Sadker and Sadker 1985).

Classroom questions are often disingenuous. Some are rhetorical: "Are we ready to begin now?" Others are mere information checks-a teacher knows the answer and wants to know if students do, too. Missing from many classrooms are what might be considered true questions, either requests for new information that belongs uniquely to the person being questioned or initiations of mutual inquiry (Bly 1986, Cook-Gumperz 1982).

The very way in which teachers ask questions can undermine, rather than build, a shared spirit of investigation. First, teachers tend to monopolize the right to question -rarely do more than procedural

network of information: clues to content (where and when the photograph was taken), technique (where the photographer stood, where the light sources were located), and meaning or attitude (what Strand felt about industry and workers). To push beyond the factual in this way is to ask students to find clues, examine them, and discuss what inferences are justified.

Interpretation Questions. If inference questions demand that students fill in missing information, then interpretive questions propose that they understand the consequences of information or ideas. One day when her English class was struggling to make sense of Frost's poem, "The Silken Tent,' a teacher asked, "Imagine if Frost compared the woman to an ordinary canvas tent instead of a silk one-what would change?" Faced with the stolid image of a stiff canvas tent, students suddenly realized the fabric of connotations set in motion by the idea of silk-its sibilant, rustling sounds; its associations with elegance, wealth, and femininity; its fluid motions. In a similar spirit, during a life-drawing class, a teacher showed his students a reproduction of Manet's "Olympia" and asked them, "How would the picture be different if the model weren't wearing that black tie around her neck?" A student laid her hand over the tie, studied the image and commented, "Without the ribbon she doesn't look so naked. She looks like a classical model. With the ribbon, she looks undressed, bolder."

Transfer Questions. If inference and interpretation questions ask a student to go deeper, transfer questions provoke a kind of breadth of thinking, asking students to take their knowledge to new places. For example, the final exam for a high school film course contained this question: "This semester we studied three directors: Fellini, Hitchcock, and Kurosawa. Imagine that you are a film critic and write a review of "Little Red Riding Hood" as directed by one of these individuals."

Questions about Hypotheses. Typically, questions about what can be predicted and tested are thought of as belonging to sciences and other "hard" pursuits. But, in fact, predictive thinking matters in all domains. When we read a novel, we gather evidence about the world of the story, the trustworthiness of the narrator, the style of the author, all of which we use to predict what we can expect in the next chapter. Far from letting their students simply soak in the content of dances, plays, or fiction, skilled teachers probe for predictions as a way of making students actively aware of their expectations. For instance, as a part of preparing "The Crucible,' a drama teacher suggested the following.

Teacher: Find a scene where you have an exchange with a character in the play. Then find a place where you can open up the dialogue and insert three or four new turns -ones you make up. I want half a page at least.
Student 1: Yeah, but it's all done.
Student 2: How can we know, anyway?
Teacher: You have all the evidence you need in the scene. What are you going to build on?
Student 1: It would have to be about the same thing.
Teacher: Mmmm mmm.
Student 2: They'd have to talk the same way they've been talking. I mean with the same kind of emotion. Also right for that character-just what they know.
Teacher: Okay, you're on.

Reflective Questions. When teachers ask reflective questions, they are insisting that students ask themselves: "How do I know I know?"; "What does this leave me not knowing?"; "What things do I assume rather than examine?" Such questions may leave a class silent, because they take mulling over. Nonetheless, they eventually lead to important talk about basic assumptions. Consider how, at the end of the year, students often read the chapters in their texts that discuss non-Western music, art, or drama. Consider, too, the power of the following question, which a music teacher asked his class on a May afternoon: "What would it mean if I called all the music we've listened to up until now, "non-Eastern music?" With that, he lifted the grain of a whole set of usual assumptions and asked that students consider what is implicit in terms such as "non-western" or "primitive."

An Arc of Questions

But simply posing a variety of questions hardly creates a climate for inquiry. At least as important is the way in which teachers respond to the answers their questions provoke. Thus, recent research (Sacker and Sadker 1985) suggests that too often students' replies meet with little more than a passing "uh-huh" Such responses

a student trying to write about why To Kill a Mockingbird is a good title for Harper Lee's novel. He has opened with Atticus's quote about not killing mockingbirds but cannot figure out how to get from the quote to the introductory paragraph of the essay.

Teacher: You have a quote and then you need to get into the part about what happens in the book, right?
Student: Yes (annoyed; he can smell that rewriting is coming).
Teacher: I think you need a transition between the two.
Student: I know, but I don't want to sound stupid by telling them (very slow and pedantic):
This-is-my-bridge-between-these-two-thoughts.
Teacher: Is it the idea that you don't like or that it sounds so obvious?
Student: It sounds so dumb.... I don't want to be someone in the story.
Teacher: (not sure what he means yet) Let's think about a comfortable way for you to make the connection. What about if you have something like, "In the book, To Kill a Mockingbird, the central character, Atticus, says...." Then you will have started in your voice, and when you go back to explaining the quote, it won't be barging in?
Student: I can't be in the story.
Teacher: How's that you being in the story?
Student: It's me explaining something.
Teacher: But an essay is a place where you do explain.
Student: I just want to go on with what happens in the story. They'll understand the connection.
Teacher: Okay, how about saying something like, "In To Kill a Mockingbird
two characters, Tom and Boo, are like the mockingbirds Atticus describes"? Student: Okay, let me see what I can do. (He goes back to his desk and writes his own version of this transition.)

At the outset, the teacher is not sure what it means "to be in the story" or why that should be so troubling. But sticking with her instinct that it is troubling, she tries-through asking genuine questions-to pin down what is bothersome. Together she and the student struggle to explain what each values or wants for the opening of an essay. At one level their communication is not smooth or particularly effective, but at another the student hears his teacher asking questions to carve out mutual understanding.

One-on-one exchanges are not the only occasions on which genuine questions arise. For instance, in arts classes -as well as in history and science classes-there are often chances to study the way a particular experience is interpreted by different individuals: a trip to see a surrealistic interpretation of Hamlet or a breakneck performance of a Brahms symphony. Alternatively, teachers have the option of showing students that deep into adulthood people run into serious questions that may consume or puzzle them, or may give them deep pleasure to solve, or both. A particular dance teacher comes to mind. In talking about her teaching she says: "My students know I choreograph and perform outside of class. Every so often I run up against a problem in my own work-the dance and the music start to rub each other the wrong way, a dancer has qualities that begin to transform the part, or I feel the dance grinding and creaking in the same old ways. So I show it to them. I say to them, "This is going wrong. Watch it and tell me what you think"

Decent Questions

The way in which teachers question provides a kind of barometer for the social values of classrooms-particularly questions of who can learn and who can teach. For instance, the way in which teachers question reveals whether they suspect learning flows only from a teacher or whether it can come from other students. In the following example (also found in Academic Preparation in the Arts) a teacher encourages students to exchange ideas about two shirts: one a polyester shirt printed with a sharp, yellow-and-black checkerboard pattern, the other an Apache overshirt of painted buckskin:

Ms. V (the teacher): By looking just at the shirts, what can you tell me about these cultures?
(Several students make contributions.)
Peter: The buckskin shirt was made in a culture that loves nature, and the polyester shirt was made in a culture that doesn't care about nature.
Ms. V: That's a big statement. What do you see in the shirt that lets you say that?
Peter: The polyester shirt hasn't got anything natural in it. The buckskin shirt is all natural: skin, hand-painted, looks to me like vegetable dyes.

20 percent require inference, transfer, or reflection (Gall 1970).

Why is this the case? Here, ironically, where the vital issue of what fuels or explains these persistent patterns of questioning emerges, there is little or no research. But each time that I have talked with teachers about questioning, they have had explanations. While teachers freely admit they have colleagues who are simply not interested in the work of questioning, they also point out that there are hurdles even for the committed. Here, in their own words, are some things they have pointed out to me.

It takes skill and practice to build a climate of inquiry, and there are few forums in which teachers can be helped in -or rewarded for-this endeavor.
"There are 34 students in the room. Some have read the story, others haven't; some understand, others are lost. It takes skill-lots of skill-to put together a discussion for those 34 people. Frankly, it is often easier for me to take charge."

It is a formidable challenge to establish and maintain a climate of inquiry with students of widely varying backgrounds and skills.
"Questions work fine when you have students who have a set of prior skills-I mean, who know about listening to what someone else says, who can follow up with a question of their own, who are used to digging for information. But what do you do when you don't find that? Do you stop to teach it? And how do you teach it, anyway?"

"My classroom has everything in it: kids whose families have taught them the 'right' thing is to be quiet and respect the teacher, kids who argue for the sake of arguing, girls who take neatly indented notes and never say a word, boys who like hearing themselves talk. How do you make it work for all of them?"

But even with such problems as class size and diversity, teachers rarely cite students as the major obstacle. Instead, they describe the culture of schools as one that dampens their own investment in inquiry.
"Don't forget that teachers live day in and day out in a school culture. That culture teaches. In most places it teaches you to suspect that there is nothing to learn from students. It puts textbooks-not primary sources-in your hands. Textbooks make for the recitation of facts. It's a culture that puts coverage above all. You have to cover all of Macbeth in twelfth-grade English, never mind how your students read. You have to get through WWII. What textbooks start, tests often enforce. In that world, questions, especially big messy ones, are dangerous. You have to keep too many of them from happening."

So what do these interested teachers want? Concretely, they ask for time and opportunity to think about their classes as moments of joint inquiry-time to observe skilled colleagues in action, time to see themselves on videotape, time to think through not just lesson plans, but process plans: when to ask, who to ask, and above all, how to ask and respond (Kasulis 1986). Teachers want not just to hear about how "prejudicial teacher questioning patterns" are, they want time to grapple with equity and excellence issues head-on, at the level of values and ethics. And, most profoundly, skilled teachers want to be engaged in inquiry themselves. Teachers want to join with scholars to think about curriculum, as occurs in the Yale-New Haven Teachers Institute and in the university-school collaborations of the Los Angeles-based Humanitas Academy. They want to have their own skills probed and honed in the way that the Bay Area Writing Program and the Dialogue program in St. Paul do by offering them (not just their students) time to write. Simply put, many teachers want to learn about the skills demanded in questioning and other forms of inquiry-but they want to learn in ways that will sustain their own abilities to inquire and reflect about their own subjects of interest.

Why Question?

These examples suggest their own reasons for why we must bother about questions despite the obstacles. Let me further venture that there may be two additional outcomes of fine questioning that often escape the notice of traditional measures of classroom achievement.

First, there is a social outcome-students need the face-to-face skill of raising questions with other people: clarity about what they don't understand and want to know; the willingness to ask; the bravery to ask again. It is as central in chasing down the meaning of a dance, the lessons of the Korean war, or the uses and

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School Improvement Research Series (SIRS)

Research You Can Use

Close-Up #5

Classroom Questioning

Kathleen Cotton

INTRODUCTION

Articles on the subject of classroom questioning often begin by invoking Socrates. Researchers and other writers concerned with questioning techniques seem to want to remind us that questioning has a long and venerable history as an educational strategy. And indeed, the Socratic method of using questions and answers to challenge assumptions, expose contradictions, and lead to new knowledge and wisdom is an undeniably powerful teaching approach.

In addition to its long history and demonstrated effectiveness, questioning is also of interest to researchers and practitioners because of its widespread use as a contemporary teaching technique. Research indicates that questioning is second only to lecturing in popularity as a teaching method and that classroom teachers spend anywhere from thirty-five to fifty percent of their instructional time conducting questioning sessions.

DEFINITION

A question is any sentence which has an interrogative form or function. In classroom settings, teacher questions are defined as instructional cues or stimuli that convey to students the content elements to be learned and directions for what they are to do and how they are to do it.

The present review focuses on the relationship between teachers' classroom questioning behaviors and a variety of student outcomes, including achievement, retention, and level of student participation. This means that certain other subtopics within the general area of questioning are excluded from the present analysis. It does not deal, for example, with the effects of textual questions or test questions, and it is only incidentally concerned with

methods used to impart study skills, including questioning strategies, to students.

What are the purposes of teachers' classroom questions? A variety of purposes emerge from analysis of the literature, including:

- To develop interest and motivate students to become actively involved in lessons
- To evaluate students' preparation and check on homework or seatwork completion
- To develop critical thinking skills and inquiring attitudes
- To review and summarize previous lessons
- To nurture insights by exposing new relationships
- To assess achievement of instructional goals and objectives
- To stimulate students to pursue knowledge on their own

These purposes are generally pursued in the context of classroom recitation, defined as a series of teacher questions, each eliciting a student response and sometimes a teacher reaction to that response. Within these recitations, students follow a series of steps (consciously or unconsciously) in order to produce responses to the questions posed. These steps include:

- Attending to the question
- Deciphering the meaning of the question
- Generating a covert response (i.e., formulating a response in one's mind)
- Generating an overt response; and often
- Revising the response (based on teacher probing or other feedback)

THE RESEARCH ON CLASSROOM QUESTIONING

CHARACTERISTICS OF THE RESEARCH

Classroom questioning is an extensively researched topic. The high incidence of questioning as a teaching strategy, and its consequent potential for influencing student learning, have led many investigators to examine relationships between questioning methods and student achievement and behavior.

The findings reported in this summary are drawn from thirty-seven research documents. Twenty-one of these are the reports of experimental or correlational studies, thirteen are reviews, one reports the results of both a review and a study, and two are metaanalyses.

The student populations of concern in these documents are:

- Elementary (mostly intermediate) - 18
- Secondary - 4

- The entire K-12 range - 14
- Not specified - 1

The research is concerned with a variety of treatments. By far the largest number of documents - twenty-six - are concerned with the relative effects on student learning produced by questions at higher and lower cognitive levels (discussed below). The subject of eight of the documents is the relationship between teacher wait-time and learning outcomes (also discussed in a later section). Other treatments include:

- Manipulating the placement and timing of questions during lessons - 2
- Using probing, redirection and reinforcement strategies - 3
- Training students in responding to higher cognitive questions, making inferences, etc. - 2
- Training teachers in questioning strategies - 3

The variables are sometimes investigated alone and sometimes in combination with each other or with other variables unrelated to classroom questioning.

The student outcome areas of concern in the research include:

- General achievement - 18
- Reading achievement (usually comprehension) - 5
- Social studies achievement - 3
- Science achievement - 3
- Mathematics achievement - 1
- Retention, as measured by delayed tests 3
- Level of student engagement/participation -9
- Cognitive level of responses produced by students - 4
- Student attitudes - 2

RESEARCH FINDINGS

General Findings

Some researchers have conducted general investigations of the role of classroom questioning and have drawn the following conclusions:

- Instruction which includes posing questions during lessons is more effective in producing achievement gains than instruction carried out without questioning students.
- Students perform better on test items previously asked as recitation questions than

on items they have not been exposed to before.

- Oral questions posed during classroom recitations are more effective in fostering learning than are written questions.
- Questions which focus student attention on salient elements in the lesson result in better comprehension than questions which do not.

Placement and Timing of Questions

- Asking questions frequently during class discussions is positively related to learning facts.
- Increasing the frequency of classroom questions does not enhance the learning of more complex material. (Some researchers have found no relationship; others have found a negative relationship.)
- Posing questions before reading and studying material is effective for students who are older, high ability, and/or known to be interested in the subject matter.
- Very young children and poor readers tend to focus only on material that will help them answer questions if these are posed before the lesson is presented.

Cognitive Level of Questions

Should we be asking questions which require literal recall of text content and only very basic reasoning? Or ought we to be posing questions which call for speculative, inferential and evaluative thinking? Some researchers have designed experiments which examine the effects of questions framed at differing levels of Bloom's Taxonomy of School Learning. These levels, in ascending order of sophistication, are: (1) knowledge, (2) comprehension, (3) application, (4) analysis, (5) synthesis, and (6) evaluation. There are other hierarchies, too, which are used as the basis for structuring comparative studies.

The majority of researchers, however, have conducted more simple comparisons: they have looked at the relative effects on student outcomes produced by what they call higher and lower cognitive questions.

Lower cognitive questions are those which ask the student merely to recall verbatim or in his/her own words material previously read or taught by the teacher. Lower cognitive questions are also referred to in the literature as fact, closed, direct, recall, and knowledge questions.

Higher cognitive questions are defined as those which ask the student to mentally manipulate bits of information previously learned to create an answer or to support an answer with logically reasoned evidence. Higher cognitive questions are also called open-ended, interpretive, evaluative, inquiry, inferential, and synthesis questions.

Research on the relationship between the cognitive level of teachers' questions and the achievement of their students has proved frustrating to many in the field of education, because it has not produced definitive results. Quite a number of research studies have found higher cognitive questions superior to lower ones, many have found the opposite, and still others have found no difference. The same is true of research examining the relationship between the cognitive level of teachers' questions and the cognitive level of students' responses. The conventional wisdom that says, "ask a higher level question, get a higher level answer," does not seem to hold.

It is only when researchers look at the cognitive level of teachers' questions in relation to the subject matter, the students, and the teachers' intent that some meaningful conclusions can be drawn from this body of research. Findings include:

- On the average, during classroom recitations, approximately 60 percent of the questions asked are lower cognitive questions, 20 percent are higher cognitive questions, and 20 percent are procedural.
- Higher cognitive questions are not categorically better than lower cognitive questions in eliciting higher level responses or in promoting learning gains.
- Lower cognitive questions are more effective than higher level questions with young (primary level) children, particularly the disadvantaged.
- Lower cognitive questions are more effective when the teacher's purpose is to impart factual knowledge and assist students in committing this knowledge to memory.
- In settings where a high incidence of lower level questions is appropriate, greater frequency of questions is positively related to student achievement.
- When predominantly lower level questions are used, their level of difficulty should be such that most will elicit correct responses.
- In most classes above the primary grades, a combination of higher and lower cognitive questions is superior to exclusive use of one or the other.
- Students whom teachers perceive as slow or poor learners are asked fewer higher cognitive questions than students perceived as more capable learners.
- Increasing the use of higher cognitive questions (to considerably above the 20 percent incidence noted in most classes) produces superior learning gains for students above the primary grades and particularly for secondary students.
- Simply asking higher cognitive questions does not necessarily lead students to produce higher cognitive responses.
- Teaching students to draw inferences and giving them practice in doing so result in higher cognitive responses and greater learning gains.
- Increases in the use of higher cognitive questions in recitations does not reduce student performance on lower cognitive questions on tests.
- For older students, increases in the use of higher cognitive questions (to 50 percent or more) are positively related to increases in:

    (1) On-task behavior

    (2) Length of student responses

    (3) The number of relevant contributions volunteered by students

    (4) The number of student-to-student interactions

    (5) Student use of complete sentences

(6) Speculative thinking on the part of students

(7) Relevant questions posed by students

- For older students, increases in the use of higher cognitive questions (to 50 percent or more) are positively related to increased teacher expectations about children's abilities - particularly the abilities of those students whom teachers have habitually regarded as slow or poor learners.

Wait-Time

Researchers on questioning strategies speak of two kinds of wait-time: "wait-time 1" refers to the amount of time the teacher allows to elapse after he/she has posed a question and before a student begins to speak; and "wait-time 2" refers to the amount of time a teacher waits after a student has stopped speaking before saying anything. The research has focused more on wait-time 1 than wait-time 2, but the following findings apply to both.

Because research has established a positive relationship between the amount of instructional content covered and student achievement, researchers and other educators have recommended that teachers keep up brisk instructional pacing. In this way, the reasoning goes, classes will cover more material, student interest will be maintained, and achievement levels will be higher. As with the research on the cognitive level of teachers' questions, this wisdom turns out to have limited application. Findings include:

- The average wait-time teachers allow after posing a question is one second or less.
- Students whom teachers perceive as slow or poor learners are given less wait-time than those teachers view as more capable.
- For lower cognitive questions, a wait-time of three seconds is most positively related to achievement, with less success resulting from shorter or longer wait-times.
- There seems to be no wait-time threshold for higher cognitive questions; students seem to become more and more engaged and perform better and better the longer the teacher is willing to wait.
- Increasing wait-time beyond three seconds is positively related to the following student outcomes:

(1) Improvements in the student achievement

(2) Improvements in student retention, as measured by delayed tests

(3) Increases in the number of higher cognitive responses generated by students

(4) Increases in the length of student responses

(5) Increases in the number of unsolicited responses

(6) Decreases in students' failure to respond

(7) Increases in the amount and quality of evidence students offer to

support their inferences

(8) Increases in contributions by students who do not participate much when wait-time is under three seconds

(9) Expansion of the variety of responses offered by students

(10) Decreases in student interruptions

(11) Increases in student-student interactions

(12) Increases in the number of questions posed by students

- Increasing wait-time beyond three seconds is positively related to the following teacher outcomes:

(1) Increases in flexibility of teacher responses, with teachers listening more and engaging students in more discussions

(2) Increases in teacher expectations regarding students usually thought of as slow

(3) Expansion of the variety of questions asked by teachers

(4) Increases in the number of higher cognitive questions asked by teachers.

Relationship Between Increasing the Use of Higher Cognitive Questions and In-creasing Wait-Time

The list of benefits produced by increasing higher cognitive questions and the list of benefits resulting from increased wait-time are remarkably similar. In addition, research has shown that the degree of improvement resulting from increases in both higher cognitive questions and wait-time is greater than an increase in either of these variables by itself. Indeed, those who have examined the relationship between these factors tell us that, in a sense, they "cause" one another. That is, the more complex mental operations required by higher cognitive questions call for - and are often found to produce - longer wait-times. And increases in wait-time seem to result in teachers and students carrying out recitations at higher cognitive levels.

Redirection/Probing/Reinforcement

The research on questioning includes investigations into the effects of redirecting questions when initial responses are unsatisfactory or incomplete, probing for more complete responses, and providing reinforcement of responses.

These practices have been discussed previously in this School Improvement Research Series. The 1988 "close-up" report entitled Instructional Reinforcement looks at the ways teachers respond to student answers and other student comments, and how the nature of those responses relate to student outcomes. Monitoring Student Learning in the Classroom, also published in 1988, discusses classroom questioning as one of many approaches teachers can use to track student learning. The findings emerging from these investigations are congruent with the general literature on questioning, including:

- Redirection and probing (often researched together) are positively related to

achievement when they are explicitly focused, e.g., on the clarity, accuracy, plausibility, etc. of student responses.

- Redirection and probing are unrelated to achievement when they are vague or critical, e.g., "That's not right; try again"; "Where did you get an idea like that? I'm sure Suzanne has thought it through more carefully and can help us."
- Acknowledging correct responses as such is positively related to achievement.
- Praise is positively related to achievement when it is used sparingly, is directly related to the student's response, and is sincere and credible.

Student Attitudes

Reports on most practices investigated by educational researchers include findings about the effects of the practice on student attitudes as well as learning outcomes. Research on the relationship between questioning practices and student attitudes is virtually nonexistent. The only findings emerging from the literature reviewed in preparation for this report include:

- The cognitive level of questions posed is unrelated to students' attitudes toward the subject matter.
- Those students who prefer lower cognitive questions perform better in recitations and on tests where lower cognitive questions are posed.
- Those students who prefer higher cognitive questions perform equally well with higher or lower cognitive questions in recitations and on tests.

37 studies

Teacher Training

Research tells us that preservice teachers are given inadequate training in developing questioning strategies and, indeed, that some receive no training at all. What happens when teachers participate in training designed to help them improve their questioning skills? Research indicates that:

- Training teachers in asking higher cognitive questions is positively related to the achievement of students above the primary grades.
- Training teachers in increased wait-time is positively related to student achievement.
- Training teachers to vary their questioning behaviors and to use approaches other than questioning during classroom discussions (e.g., silence, making statements) are positively related to student achievement.

Guidelines for Classroom Questioning

Based on the foregoing findings from the research on classroom questioning, the following recommendations are offered:

- Incorporate questioning into classroom teaching/learning practices.
- Ask questions which focus on the salient elements in the lesson; avoid

questioning students about extraneous matters.

- When teaching students factual material, keep up a brisk instructional pace, frequently posing lower cognitive questions.
- With older and higher ability students, ask questions before (as well as after) material is read and studied.
- Question younger and lower ability students only after material has been read and studied.
- Ask a majority of lower cognitive questions when instructing younger and lower ability students. Structure these questions so that most of them will elicit correct responses.
- Ask a majority of higher cognitive questions when instructing older and higher ability students.
- In settings where higher cognitive questions are appropriate, teach students strategies for drawing inferences.
- Keep wait-time to about three seconds when conducting recitations involving a majority of lower cognitive questions.
- Increase wait-time beyond three seconds when asking higher cognitive questions.
- Be particularly careful to allow generous amounts of wait-time to students perceived as lower ability.
- Use redirection and probing as part of classroom questioning and keep these focused on salient elements of students' responses.
- Avoid vague or critical responses to student answers during recitations.
- During recitations, use praise sparingly and make certain it is sincere, credible, and directly connected to the students' responses.

Detailed instructions for teaching students to draw inferences is outside the scope of this paper. However, the model offered by Pearson (1985) does provide some basic steps which can help students make connections between what they know and what they are seeking to learn. Pearson suggests that teachers complete all the steps in this process by way of demonstration, then gradually shift responsibility for all but the first step to the students.

1. Ask the inference question.

2. Answer it.

3. Find clues in the text to support the inference.

4. Tell how to get from the clues to the answer (i.e., give a line of reasoning).

Better preservice training in the art of posing classroom questions, together with inservice training to sharpen teachers' questioning skills, have potential for increasing students' classroom participation and achievement. Increasing wait-time and the incidence of higher

cognitive questions, in particular, have considerable promise for improving the effectiveness of classroom instruction.

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Compares the questioning behavior of four preservice and four inservice teachers in an inner city elementary school. Also compares the teachers' approaches to questioning high and low ability students.

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Reviews research on the effects of questioning-particularly the level, placement, and timing of questions during reading lessons. Offers guidelines for classroom questioning.

Brophy, J., and Good, T.L. "Teacher Behavior and Student Achievement." In Handbook of Research on Teaching (3rd ed.), edited by Merlin C. Wittrock. New York: Macmillan Publishing Co., 1985.

Summarizes research on classroom practices which are positively related to student achievement. Regarding teachers' classroom questioning strategies, research indicates that (1) most questions should elicit correct responses; (2) higher cognitive questions are not categorically better than lower cognitive questions; and (3) teaching complex cognitive content calls for asking questions that few students can answer correctly (or which have no one correct answer).

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Examines the effects of eliminating literal questions-and asking only inferential questions-on the literal and inferential comprehension of third and fourth graders. Experimental students outperformed controls on both literal and inferential comprehension tests.

Dillon, J.T. "Research on Questioning and Discussion." Educational Leadership 42(1984): 50-56.

Draws a distinction between recitation and discussion and cites research regarding the nature and effectiveness of discussion. Offers recommendations for engaging students in discussions and makes suggestions for further research.

Gall, M. "Synthesis of Research on Teachers' Questioning." Educational Leadership 42(1984): 40-47.

Reviews research on the effects of teachers' questioning techniques and identifies implications of this research for classroom practice.

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Reports the results of two experiments involving the study of ecology by sixth graders (n=336 and n=371). Found that probing and redirection questions had no effect on student achievement, nor did varying levels of higher cognitive questions. Recitation treatments involving scripted lessons were effective in promoting achievement.

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Hansen, J., and Pearson, P.D. The Effects of Inference Training and Practice on Young Children's Comprehension. Technical Report No. 166. Cambridge, MA: Bolt, Beranek and Newman, Inc.; Champaign, IL: University of Illinois, 1980. (ED 186 839).

Investigates the effects of giving children instruction and practice in making inferences upon their reading comprehension. Twenty-four second graders in a treatment condition and two comparison conditions participated. Practice in drawing inferences enhanced comprehension.

Henson, MT. "Questioning as a Mode of Instruction." The Clearing House 53(1979):14-16.

Provides an overview of research findings on teachers' classroom questioning and provides guidelines for framing and asking more productive questions.

Honea, J.M., Jr. "Wait-Time as an Instructional Variable: An Influence on Teacher and Student." The Clearing House 56(1982): 167-170.

Reports the results of an experiment in which the effects of increasing wait-time were studied. Twenty-four high school students participated in their social studies classes. Increasing wait-time to three to five seconds significantly improved student engagement and participation.

Hoxmeier, E.A. Questioning Techniques for Teachers: Teaching Reading, Thinking, and Listening Skills. Paper presented at the Annual Meeting of the North Central Reading Association, South Bend, IN, October 23-25, 1986. (ED 284 186).

Presents current research on questioning techniques for classroom use. Analyzes different types of questions and provides information on teachers' actual question-posing behaviors. Offers guidelines for classroom questioning.

Hunkins, F.P. "Effects of Analysis and Evaluation Questions on Various Levels of Achievement." The Journal of Experimental Education 38(1969): 45-58.

Studies the relative effects of higher and lower cognitive questions in the social studies text materials of students in the sixth grade. Higher cognitive questions produced significantly higher scores than did lower cognitive questions.

Johnston, J.D.; Markle, G.C.; and Haley-Oliphant, A. "What Research Says About Questioning in the Classroom." Middle School Journal 18(1987): 29-33.

Summarizes research on the effectiveness of recitation and discussion, the use of differing cognitive levels of questions, the effect of questioning on student participation, the usefulness of prescriptions for questioning, and teacher thinking regarding questioning.

Kennon, C.H. Utilizing Moral Dilemmas to Enhance Comprehension. Paper presented at the Annual Meeting of the International Reading Association, St. Louis, MO, May 5-9,1980. (ED 189 548).

Cites research regarding the value of higher cognitive questioning techniques and proposes use of the Cognitive Developmental Approach to Moral Education to foster higher level thinking skills. Presents results of a study involving this instructional approach.

Kleinman, G.S. "Teachers' Questions and Student Understanding of Science." Journal of Research in Science Teaching 3(1965): 307-317.

Investigates the relationship between teachers' questioning techniques and (1) both teacher and student behavior, and (2) student achievement. Seventh and eighth graders in 23 science classes participated. Most significant findings were that (1) all students of teachers who asked predominantly critical thinking questions were more on-task, alert, etc., and (2) higher ability students showed greater improvement with critical thinking questions than similar students asked lower level questions.

Mahlios, M., and D'Angelo, I. Teacher Questions: An Experimental Analysis of the Question Effect Hypothesis. Paper presented at the Annual Meeting of the Association of Teacher Educators, Orlando, FL, February 1, 1983. (ED 227 062).

Investigates the effects of different types of classroom questioning on the nature of student responses, student achievement and student attitudes. Higher order questions led to higher achievement but did not seem to affect attitude measures. Student answers were both longer and at higher levels when they were exposed to higher level questioning.

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"pitfalls" to help teachers ask more productive classroom questions.

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10

Cues, Questions, and Advance Organizers

At the beginning of an introductory high school psychology course, Mrs. Crawford writes the word *psychology* on the board. Then she asks students to tell her everything they know about the term. As students answer, she writes key words on the board. Mrs. Crawford selects a few words to consider in more depth—*Freud, psychoanalysis, ego, id, bipolar, multiple personalities.* For each selected item, students are asked what they know to be true or believe to be true. When she asks students what they know about Sigmund Freud, she is surprised at the depth of their knowledge about him. As students address each term, Mrs. Crawford records ideas on the board. By the end of the discussion, Mrs. Crawford has a list of the basic knowledge students have about psychology. Throughout the course, Mrs. Crawford uses this information as the springboard for introducing new information.

The techniques in the final category of instructional strategies all help students retrieve what they already know about a topic. In nontechnical terms, this is sometimes referred to as "activating prior knowledge." Mrs. Crawford was activating the prior knowledge of her students in an informal but effective way.

Educational researchers have shown that the activation of prior knowledge is critical to learning of all types. Indeed, our background knowledge can even influence what we perceive. Brewer and Treyens (1981) demonstrated this effect. They brought 30 students individually into a room and told them that it was the office of a professor who was conducting an experiment. Each student was asked to wait for a short while. After 35 seconds, the students were

ence. For example, a teacher is providing students with a cue when she explains that the film they are about to watch on the functioning of the cell will present some information they already know about the cell, but it will also provide some new information. Because the teacher provided the topic of the film for students, she allowed them to activate their prior knowledge. Also, the teacher has told them to expect some new information, which establishes expectations for students. Questions perform about the same function. For example, before watching the film on the functioning of the cell, the teacher might ask students questions that elicit what they already know about the topic.

It is probably safe to say that cueing and questioning are at the heart of classroom practice. In fact, research in classroom behavior indicates that cueing and questioning might account for as much as 80 percent of what occurs in a given classroom on a given day (see Davis, O. L., & Tinsley, 1967; Fillippone, 1998). In addition, teachers are largely unaware of the extent to which they use cueing and questioning. To illustrate, in a study published in 1974, Nash and Shiman found that elementary teachers who thought they were asking 12 to 20 questions every half hour were actually asking 45 to 150 questions. Fillippone (1998) has reported this same trend in recent years.

The following generalizations can guide teachers in using cues and questions:

1. **Cues and questions should focus on what is important as opposed to what is unusual.** Several studies have demonstrated that all too often teachers structure questions around information that is unusual or that they perceive as interesting, as opposed to information that is critical to the topic being studied (see Alexander & Judy, 1988; Alexander, Kulikowich, & Schulze, 1994; Risner, Nicholson, & Webb, 1994). Many teachers engage in this practice under the mistaken assumption that it will increase students' interest in the topic. What is ironic about this situation is that research actually indicates that the more students know about a topic, the more they tend to be interested in it (Alexander et al., 1994). Consequently, questions designed to help students obtain a deeper understanding of content will eventually increase their interest in the topic.

2. **"Higher level" questions produce deeper learning than "lower level" questions.** A fair amount of research indicates that questions that require students to analyze information—frequently called higher-level questions—produce more learning than questions that simply require students to recall or recognize information—frequently referred to as lower-order questions (see Redfield & Rousseau, 1981). Unfortunately, most of the questions teachers ask are lower order in nature (Davis, O. L., & Tinsley, 1967; Fillippone, 1998; Guszak, 1967; Mueller, 1973). Although you can find many definitions of

missing information. Questions can greatly aid students in this process. Teachers might use the following questions to help students make inferences about things, people, actions, events, and states of being they might be studying.

Things/People:

What action does this thing or person usually perform?
What action is usually performed on this thing?
How is this thing usually used?
What is this thing part of?
What is the process for making this thing?
Does this thing have a particular taste, feel, smell, sound? What is it?
Does this thing have a particular color, number (or quantity), location, or dimensionality? What is it?
How is this thing usually sold?
Does this thing have a particular emotional state? What is it?
Does this thing have a particular value?
When this thing is used, does it present a particular danger to other things or to people? What is it?

Actions:

What thing or person usually performs this action?
What effect does this action have on the taste, feel, sound, or look of this thing?
How does this action typically change the emotional state of a thing or person?
How is the value of a thing changed by this action?
How does this action change the size or shape of a thing?
How does this action change the state of a thing?

Events:

What people are usually involved in this event?
During what season or time of year does this event usually take place?
On what day of the week does this event usually take place?
At what time of day does this event usually take place?
Where does this event usually take place?
At what point in history did this event take place?
What equipment is typically used in this event?
How long does this event usually take?

States (of Being):

What is the basic process involved in reaching this state?
What are the changes that occur when something reaches this state?

To use these questions, a teacher would identify things, people, actions, events, and states in information the students were

an argument for or against the protection of "old growth" forests. Regardless of the position they take, students are required to present a sound argument and are judged on the strength of their argument and the strength of their evidence.

Research and Theory on Advance Organizers

Another way that teachers can help students use their background knowledge to learn new information is to present them with advance organizers. The concept of advance organizers was first popularized by psychologist David Ausubel (1968), who defined them in the following way:

> Appropriately relevant and inclusive introductory materials ... introduced in advance of learning ... and presented at a higher level of abstraction, generality, and inclusiveness than the information presented after it. The organizer serves to provide ideational scaffolding for the stable incorporation and retention of the more detailed and differentiated materials that follow. Thus, advance organizers are not the same as summaries or overviews, which comprise text at the same level of abstraction as the material to be learned, but rather are designed to bridge the gap between what the learner already knows and what he needs to know before he can successfully learn the task at hand (p. 148).

Since Ausubel's first writings on the topic, researchers have studied advance organizers in great depth. Figure 10.3 summarizes the

FIGURE 10.3

Research Results for Advance Organizers

Synthesis Study	Focus	No. of Effect Sizes (ESs)	Ave. ES	Percentile Gain
Walberg, 1999	General effects of advance organizers	21	.45	17
Hattie, 1992	General effects of advance organizers	387	.37	14
Lott, 1983[a]	General effects of advance organizers	135	.19	7
		135	.23	9
Stone, 1983	Expository advance organizers	44	.80	29
	Narrative advance organizers	12	.51	20
	Skimming as an advance organizer	15	.71	26
	Illustrated advance organizers	15	.52	20

[a] Two effect sizes are listed for the Lott study because of the manner in which effect sizes were reported. Readers should consult that study for more details.

each description. Then, as a whole class, they briefly discussed each career. Mr. Matamoros told students to consult the information contained in the advance organizers as they heard about each career option.

After Career Day, many of the students commented that they felt that the organizer was critical to their understanding of the information about the various careers. Some of the visitors who led the sessions expressed the fact that they were impressed with the quality and focus of students' questions.

Narrative Advance Organizers

Narrative advance organizers present information to students in story format. The following example shows how one teacher used a narrative advance organizer with the topic of tornadoes.

Before Ms. Neeley's 4th grade class viewed a film about tornadoes, she told them this personal story about tornadoes:

"I was in a tornado once, but I didn't know it until after it was over! I had gone to visit my sister. It was 3:00 in the afternoon, and we were in the living room drinking tea and talking. It became very dark, and it was only 3:00 in the afternoon! But we never dreamed a tornado was coming. We just turned on the lights, opened the window shades, and continued to drink tea and talk. A bit later the lights suddenly went out and, at the same time, sirens started wailing. We kind of wondered what was going on, but it didn't occur to us to worry. A few minutes later my husband called—the phones were still working. He asked me if I was okay and I said, "Of course, why wouldn't I be?" He told me that a tornado had just touched down about four blocks from where I was. Suddenly it all made sense. My sister and I raced down the street, and sure enough, the tornado had cut a path right through an intersection. The stop lights were upside down, cars were overturned, and huge trees had been uprooted. The glass was blown out of the windows at a furniture store and across the street at a fast food restaurant. The destruction was awesome."

Skimming as a Form of Advance Organizer

Skimming information before reading can be a powerful form of advance organizer. The following example shows how a 6th grade teacher used skimming in the context of a science class.

The students in the 6th grade were going to take a field trip to the Planetarium. For homework, Mr. Armstrong asked the students to skim two pages he reprinted from the Atlas. One was a diagram of the Star Maps of the Northern Hemisphere and the second was the Southern Hemisphere. The maps also had a key and some facts.

"Just skim the maps," he said. "Try to become familiar with some of the patterns so that when we go to the planetarium, you'll have some sense of what you might be seeing."

Graphic Advance Organizers

Chapter 6 discussed graphic organizers as a type of nonlinguistic representation. They also can be effectively used as advance organizers. The following example shows how a teacher used a graphic orga-

MIDDLE SCHOOL
Journal

The flip side of questioning

A provocative reassessment of the value and place of the time-honored question as a teaching tool.

DWIGHT L. ROGERS

Why do so many educators continue to strongly support the use of questions to promote classroom discussions? Even the *Handbook of Effective Questioning Techniques* suggests that teachers should use questions to "increase pupil talk" and "facilitate discussion" (Blosser, 1973). According to Dillon (1982), "Only in education are questions asked in the belief that they will stimulate thought and encourage expression" (p. 146). In fact, he goes so far as to claim that in other fields, "Questions are [considered] a very good means to *keep* [italics added] people from talking" (p. 136). Yet, we teachers relentlessly ask question after question in the hope of promoting our students' thinking and facilitating classroom discussions. Dillon asserts that "experts" in education have based their belief that questioning is an important teaching strategy on "conventional wisdom" or "presumptive knowledge" and not on research findings. Therefore, perhaps we should examine research and the practice of questioning as reported in other disciplines.

The Use Of Questions In Other Disciplines

Dillon reports that "the avoidance of questions characterizes those enterprises where, as in classroom discussion, it is essential to enhance expression of thought" (p. 137). Personnel interviewers are instructed to avoid asking direct questions whenever possible (Lopez, 1965). Questions are perceived as a form of intervention by psychotherapists (Olinick, 1954) and of "doubtful value" to counselors (Arbuckle, 1950). Therapists believe questions "produce blocking," which inhibits thought (Curran, 1952).

Opinion-pollsters and cross-examiners have learned that "the great majority of questions implicitly instruct the respondent to limit the length of his response" (Dillon, 1982, p. 136). The respondent to such questions is expected to provide the information asked for and then patiently wait for the inevitable follow-up question. The question-answer sequence is specifically designed not to encourage the expansion of discourse, but to control the flow of the conversation and restrict its content. Like the questions of opinion-pollsters and cross-examiners, teachers' inevitable follow-up questions also rigidly direct and control the course of the conversation which, *in turn*, constrains the discussion. The paradox is, whereas pollsters and cross-examiners ask questions to *delimit* thinking and speaking, we teachers rely on our discussion questions to *enhance* thought and stimulate response.

The Social Side Of Questions

Questions, like any other form of oral communication, contain both informational and relational intentions. The informational aspect of a question is its content, and the relational aspect concerns its interpersonal effects. As Tammivarra and Enright (1986) explain, the relational aspect of a question "tells one's partner how he or she is seen by the speaker, thereby commenting upon the relationship of the partners" (p. 219).

Teachers are placed in the precarious roles of both teacher and evaluator, and students often view each question asked as a "test." Our questions appear to "tell" students that we do not trust them to learn without being checked on (Jackson, 1986). The tension created by these face-to-face public testing situations places a great emotional strain on some students, inhibiting rather than facilitating dialogue.

Young adolescents can find questions especially socially intrusive because of their potential for making students appear ignorant before their teacher and peers. Students frequently see themselves in the position of needing to guess the answer the teacher is looking for. According to Blank and White (1986), "Academic dialogues are difficult by their very nature. However, when they are formulated so as to demand high levels of inferencing about the very topic under discussion, they violate the basis of shared intellectual context. Teachers do not establish psychological comfort and eagerness to learn by making students spend as much, if not more, energy deciphering their intent than thinking about the content of their questions . . ." (p. 8).

To gain a better conception of the potential negative social consequences of classroom questioning, it may be helpful to understand the derivation of the question-word "interrogative." "Interrogative" is derived from the Latin word, "interrogare," meaning to ask. It is related to the words "interrogate" and "interrogation," both of which produce images of police detectives ruthlessly questioning suspected criminals, prisoners of war being savagely tortured for refusing to answer the questions of their captors, or prosecuting attorneys relentlessly cross-examining the defense's star witness.

In many instances, teachers' systematic classroom questioning may seem like a devious form of interrogation to their students. In fact, Dillon (1982) reports that a high frequency of questions in classrooms results in "highly strung nervous tension" and a "high pressure atmosphere" not unlike the interrogations mentioned above. This tense, high

pressure atmosphere appears to encourage not discussion and thought but the very opposite, "student passivity, dependency, and reactivity" (p. 142).

According to Wood and Wood (1983), asking too many questions one right after the other inhibits students' expression of thought. The early childhood teachers they studied who asked the most questions were the least likely to receive answers from their young students. Their students were also less likely to elaborate on their answers, ask their own questions, or contribute personal comments to the discussion.

Excessive questioning is not acceptable in everyday conversation, and adults will often refuse to answer and even sanction an individual who continually asks questions. Students, too, simply will ignore, or at best hastily brush off continual questioning by their teacher. The more questions asked, the fewer and briefer the answers. Withdrawal, rather than participation results (Blank and White, 1986).

Questions And Power

As Wood and Wood (1983) suggest, "We do not, of course, deny the importance of skilled and sensitive questioning. At best, a good question (and the definition of 'good' is a problem of the first order) helps a child . . . to 'decontextualize' his thinking, to explore his own thoughts, to discover ambiguities, inconsistencies and gaps in his knowledge, and so forth. But questions are also an exercise in power. He who questions, controls, and he who answers runs the risk of appearing ignorant or silly" (p. 161).

Thus, questions constrain classroom response because they are, in socio-linguistic terms, an expression of authority relationships, and they establish a subordinate, reactive role for the respondent. Students' participation in many classrooms is restricted because the teacher, not the student, has the power to initiate the exchange, pick the topic of questioning, and determine the format of the student's response. During classroom questioning the student often "answers when asked and otherwise keeps his mouth closed—and undoubtedly his mind and heart as well" (Benjamin, 1974, p. 66).

Particularly threatening, as symbols of teacher power, are what Jackson (1986) calls "on-the-spot" or testing questions. These are questions like: "What is the capital of Italy?", "How many miles is the sun from Earth?", or even "What is the process of photosynthesis?" This type of questioning is especially intimidating to middle school students because they are keenly aware of their teacher's evaluation power—the grade. The student has little to gain and much to lose by attempting to answer these kinds of testing questions.

> *Teachers' questions are expressions of authority and may be intimidating to grade—conscious students*

Questions And The Expression Of Thought

Much of the literature in education strongly recommends that teachers use open-ended questions to stimulate longer student responses. This recommendation, however, may be yet another misconception about the use of questions. Dillon (1981) reports the class mean response of high school students to teachers' closed questions was almost twice that of the mean response to their open questions. (Even Mischler's (1978) study in primary classrooms indicates that children's responses to their teachers' open-ended questions are briefer than their responses to the closed-ended questions of other children.) Finally, outside of the classroom, a summary of survey research concludes that, contrary to popular belief, there appears to be no difference in individuals' responses to open-ended or closed-ended questions (Sudman & Bradburn, 1974).

Educational literature has proclaimed that higher-cognitive order questions elicit complex thought. Yet, Johnston, Markle, and Haley-Oliphant (1987) report in their review of research, "the verdict on the use of higher- or lower-level questions is still out" (p. 30). Furthermore, none of the results of experiments reviewed by Winne (1979) provide evidence that such questions stimulate complex thinking. As Dillon (1982) explains?

From an analytic perspective, a high-level question would characterize the talk, perhaps the thought, of the questioner, not the respondent. It makes a request, not elicits a response, for information, not cognition. It might be said to express high-level thinking, but it does not cause it in the respondent. Thus, teacher questions would not be said to stimulate student thought, nor higher questions higher thought (p. 132).

Teachers are often advised by educational "experts" that the best way to encourage students to think and to express their ideas is to pose a problem in the form of a question. Dillon (1982) points out, however, that *teachers' questions* are formulated from *teachers' problems* not from *students' problems*. In order for teachers and students to "share the same question, both parties would have to experience the perplexity which it expresses and feel the same need for the information which it requests" (p. 131). Tizard, Hughes, Pinkerton, and Carmichael (1982) report limited responses to teachers' questions not because students are unable to give richer answers, but because they are not sufficiently interested in the questions. As Nathan Isaac's suggests, "It is a complete error to equate the situation in which we ask children 'why' questions, with that in which they ask us . . . when such questions are put to the child, he is not involved, often not interested. He has experienced no shock or stimulus or puzzlement . . ." (Tizard et al., 1982, p. 106).

> *Open-ended questions do not seem to elicit longer and better student responses*

Alternatives To Questions

How might teachers facilitate discussion and encourage thinking in middle school classrooms without asking lots of questions?

In our day-to-day communication with each other, we certainly do not rely heavily on "the question." For a more natural approach in the classroom, teachers might begin a discussion not with a question, but a statement instead and then allow the students to respond, affirmatively or negatively, in a give and take. Juices would flow, and, while teachers might need to play a guiding role, students would be reacting and interacting.

As Colby (1961) points out, a statement has more informational "surprise-value" than a question and is more "ambiguous"; thus the course of the discussion may be less clearly defined in terms of its direction and length. By hearing a statement as opposed to being asked a question, students may utilize the personal information and experience they already possess, accepting or rejecting the information presented. "They are left free to adduce all manner of justifications, to give supportive data, examples of counterinstances, and so forth" (Richardson, Dohrenwend, and Klein, 1965, p. 260).

In the question mode, for example, a middle school teacher might ask "Jennifer, what is the Constitution and when was it signed?", which would either demand a brief, constrained response or create embarrassment for Jennifer. Instead of asking a question, even a more open-ended one, the teacher might simply make a statement broad enough for different points of view to surface, about the historical context and significance of this important document, and then pause and wait for students' comments. A teacher might say, "Not all of the original 13 states thought the Constitution was such a great idea, and it took a while for four of the states to sign it." This might lead off in a myriad of directions: talk about the 13 original states, a discussion of the Articles of Confederation Convention, a dialogue on the issues debated during the Constitutional Convention, or even a debate about states' rights and the balance of power.

The declarative statement approach leaves more room for students' own questions, interpretations, and elaborations. At the same time, students who are unaware or confused about the context and significance of the Constitution might profit from the information provided by the teacher's initial statement. In the discussion, the students might bring out relevant information that would have been left unsaid if the discussion had been initiated by a potentially threatening and narrowly focused question. The statement approach also allows a teacher to learn new information about the students' understanding of the topic under discussion and thus both evaluate the students' knowledge in a more relaxed and natural manner and use this new information to adapt and adjust the content of the lesson and the unit of study.

> *"A declarative statement leaves room for many questions and elaborations.*
>
> *Teacher silence may enhance the amount and quality of responses*

A conversation-like classroom exchange may also encourage students to ask both teachers and other pupils their own questions. An increase in students' questions may not only provide teachers with a wonderful opportunity to help students gain a deeper understanding of the subject being discussed and correct their misconceptions but also assess students' knowledge. Student-initiated questions may also further increase the chances for extended discussions and greater student participation. Most early adolescents interact with other students much more freely than with their teacher. Answers are longer and more elaborate to peers' questions than to teachers' queries (Dillon, 1982).

Do we teachers talk too much? According to Dillon (1982), teacher silence may enhance the amount and quality of student responses. His review of studies of between-speaker silences finds silence positively relates to: the frequency of response; the length of response; and the cognitive level of response. The most prominent example of this research in classrooms is Rowe's "wait-time" study. Rowe (1974) found the mean student response increases from seven to 28 words when a teacher increases her pausing time, or wait-time, from one to three-plus seconds after asking her question and after the student responds.

Silence, however, may be uncomfortable for teachers who need to feel in control of classroom discourse and appear uneasy with the silence when the dialogue pauses or halts; teachers may want to consider practicing silent pauses in a conscious and deliberate manner. Although some experts in education have advised teachers to follow-up immediately for a further response when a student pauses, probing in this manner is intrusive and may have a depressing and delimiting effect. If teachers were instead to wait and avoid speaking at the instant a student paused, "they would likely hear further expression of higher thought" (Dillon, 1982, p. 141).

Finally, if teachers are truly concerned about promoting real dialogue in classrooms, they must examine closely the daily interactions and relationships with students. The results of a case study of one teacher who was extremely effective in promoting dialogue in her classroom suggest that it was the students' perception of this teacher as having a sincere interest in and appreciation of them and their ideas that allowed her to develop a student-teacher relationship that facilitated discussion. This relationship was built on trust and mutual respect as opposed to teacher dominance and control (Rogers, Perrin, and Waller, 1987).

If teachers expect students to listen to them, they must take time to listen to the students, to become interested in their ideas, and to make them aware of a sincere interest in their ideas. Tammivarra and Enright (1986) suggest we can show our interest by communicating to our students "that we find their answers infinitely more interesting than our questions" (p. 226). If we expect our students to be eager learners, we teachers must exhibit our own eagerness to learn about their ideas.

Conclusion

The value of sensitive, well-crafted questions should not be overlooked. Results of research of classroom questioning, as well as the findings of research and practice from other disciplines outside of education, however, indicate the need to carefully reconsider the use of questions as a technique to facilitate middle school students' thinking and promote classroom discussions. Teaching is a situation-specific activity, and teachers may need to use a variety of strategies, including questions, to encourage dialogue and thought. It appears, however, questions under certain circumstances may actually restrict dialogue and inhibit thought. Questioning practices in classrooms sometimes may even create situations more like an inquisition than an enlightened discussion.

Alternative approaches to the use of questioning as a form of verbal evaluation may help provide an accepting and relaxed atmosphere which will encourage students to share their ideas. Classroom dialogues and students' thinking may be enhanced, not through teachers asking a barrage of questions, but by making discussions more conversation-like, through substituting declarative statements for questions, deliberately using silent pauses, and providing students with the opportunity to ask their teachers and each other questions.

Lastly, and perhaps most importantly, teachers must be sure to exhibit sincere interest in students' comments and questions. Once students realize teachers respect their ideas and take them seriously, rich exchanges of information and intellectually stimulating discussions should flourish in middle school classrooms.

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My Favorite Place

On days when others want me to be,
A person who is not really me,
I like to withdraw from the
popularity race,
And return to my special, favorite
place.

And on days when I have to
look my best,
But would rather ignore the way
I'm dressed,
And would rather not wash my
face,
I love to return to my favorite
place.

And on days when I'm lonely
or helpless or sad,
And every solution I have seems
bad,
I can always find a friendly space,
When I return to my warm,
favorite place.
No matter where life causes
me to roam,
My favorite place is always my
home.

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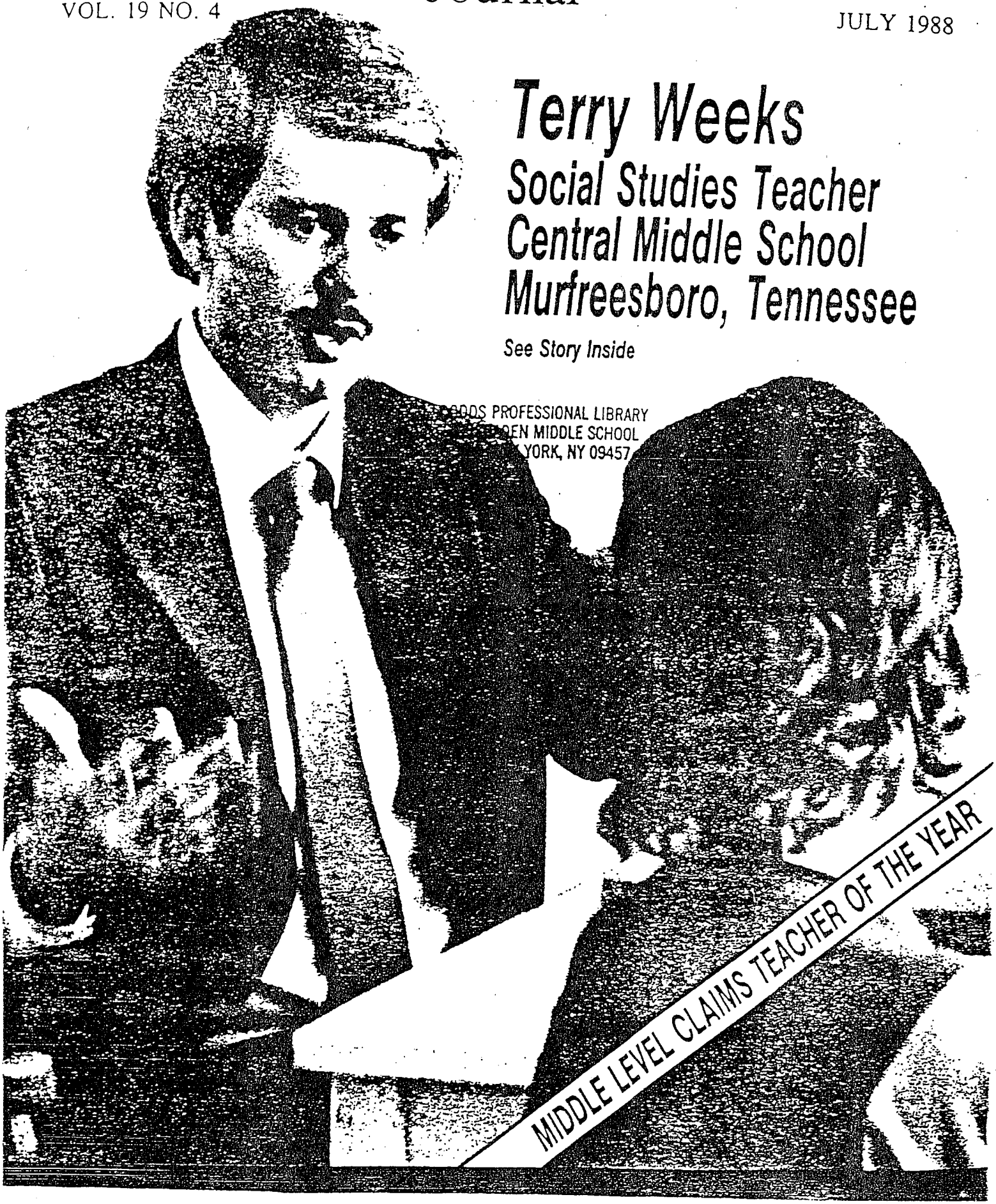

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MIDDLE LEVEL CLAIMS TEACHER OF THE YEAR