

What Research Says to the Teacher

Questioning Skills, for Teachers

Second Edition

by William W. Wilen

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The research reported since the publication of the first edition of this monograph continues to support the growing influence of teachers' questions and questioning techniques on student learning.

Several comprehensive reviews of research on questioning have implications for improving questioning skills. Dillon examined the nature of discussions and the role of questions (A).^{*} He suggested that questions may inhibit student participation and that teachers should use alternative approaches, an idea that he developed in his book (B). Gall reviewed the research on the use of questions in recitation and found support for the effectiveness of that method (D). He recommended that students learn more about teacher questions and responding to them, and that teacher educators help teachers use recitation in their classrooms. In his review Wilen provided specific recommendations for teacher educators (L).

Several symposia at the 1985 meeting of the American Educational Research Association considered the significant contributions that researchers from many disciplines can make to questioning. All the papers analyzed five audiotaped secondary-level class sessions. Wilen reviewed several papers representing a pedagogical perspective (N). Roby identified five types of discussions in the taped episodes, each involving a variety of questions (G). Swift, Gooding, and Swift found that teachers needed greater understanding of basic discussion skills, including the use of wait time to stimulate student thinking (K). Francis reached a similar conclusion and found that students had not been trained in discussion skills (C). Wood and Wood found that teachers' questions served to control the group—the more questions teachers asked, the less initiative students took in asking questions or making comments (O). Russell concluded that, for the most part, teachers did not encourage students to provide rational support for their knowledge claims (H). The major implication of these studies is the need for pre- and in-service teacher training in skills for conducting effective discussions. An adaptation of the training program used by Schuck in his study might serve as a model to help accomplish this goal (I).

A continuing trend of the 1980s has been the attempt to identify specific questioning levels and techniques that impact student growth, particularly cognitive growth. Applying the meta-analytical technique to 20 previously conducted studies on the relationship between the level of teacher questioning and student achievement, Redfield and Rousseau found that the predominant use of higher-level questions led to gains in achievement (F). In addition, Wilen and Clegg in their synthesis of research findings identified several other questioning skills as positive correlates with achievement—phrasing, academic questions, low cognitive-level questions, wait time, probing of responses, and acknowledgment of correct responses (M).

Another area that has received increased attention is that of student-initiated questions. Research has suggested that such student involvement would reduce teacher control of discussions and thereby make students more effective learners. Hunkins proposed that teachers should help students devise questions within a planning, implementing, and assessing cycle (E). This would help reduce students' dependency on the teacher's authority and increase their opportunities for thinking. Steinbrink proposed several types of questions that students can learn to develop: descriptive, policy, opinion, and futures (J). More research in this alternative area is needed.

^{*}See New Resources for the Second Edition on page 33.

INTRODUCTION

Since the turn of the century little disagreement has existed concerning the definition of questions or the variety of functions they can serve in the classroom. A question is broadly defined as any sentence having either an interrogative form or function. More precisely, teacher questions are instructional cues or "stimuli that convey the content elements to be learned and directions for what they are to do and how they are to do it" (75, p 26).^{*} For example, "What is your opinion of the emphasis of the current economic policy?" and "Name the stages of photosynthesis." Both examples serve the function of instructional cues because they communicate content (current economic policy and photosynthesis) and direction (forming an opinion and recall) in both interrogative ("What is...?") and declarative ("Name the...") forms.

Because of the purpose they serve, questions have always been considered the "core of effective teaching" (56, 52). Over 120 years ago Ross suggested two major purposes for questions: to ascertain whether students understand and remember what has been taught and to have students apply what they have learned (92). These two purposes clearly illustrate the major differences between current theory and practice. Theory suggests that teachers should ask higher-cognitive-level questions to have students apply learnings, while practice demonstrates that teachers ask low-cognitive-level questions to check recall of knowledge.

This publication reviews the research findings related to the verbal questioning behaviors and practices of teachers. It emphasizes current research related to the impact of questioning practices on student thinking, achievement, and attitudes. This includes questioning techniques and strategies, and approaches to analyze classroom questions. Finally, it suggests an approach for teachers to use to gather information on their questioning behaviors in order to begin systematically improving their questioning practices.

DEVELOPMENT OF INTEREST IN QUESTIONING

Research on Questioning

From 1900 to 1950, the research on questioning was meager in quantity but significant in that findings provided an awareness of teachers' questioning behaviors (104, 21, 5, 22, 23, 24, 27). Stevens, who conducted the first major systematic research in 1912, found

^{*}Numbers in parentheses in the text refer to the Bibliography beginning on page 27.

that approximately 80 percent of the average school day was occupied with teacher questions and student answers. Teachers verbalized about 64 percent of the time and asked about two to four questions per minute. Students were expected to recall facts, but not necessarily to engage in thinking above the memory level. Stevens concluded that if instruction were to improve, teachers must develop questions that stimulate reflective thinking (104).

Beginning with the Stevens study, describing teachers' questioning behaviors became an area of research. For the most part, researchers' findings supported the discovery of low-cognitive-level questions (21, 5, 22). Three developments during the 1950's and 1960's stimulated renewed interest and further research in this area. First, increased attention to intellectual achievements developed following the successful Soviet launch of Sputnik in 1957. Fearing that our academic programs were inferior to those of other countries, the federal government supported the development of a wide range of curricular projects. The instructional strategies required to teach the new curricula emphasized the development of students' higher thought processes. These strategies, such as inquiry, relied heavily on the teacher's ability to stimulate critical and creative thinking skills through effective questioning behaviors (31).

Second, to study teaching directly, researchers applied systematic observation techniques in classrooms to objectively describe and analyze teacher behaviors. Starting with Flanders' Interaction Analysis and Amidon and Hunter's Verbal Interaction Category System, many of these instruments included categories intended to gather objective data on teachers' questioning behaviors in order to determine effectiveness (40, 1, 31).

And third, the research of Bloom and Guilford gave impetus to major efforts to identify and classify components of the cognitive operation in the classroom. Despite the different intentions of these researchers—devising categories of intellectual operations—their models served to stimulate valuable research into the cognitive aspects of classroom interaction—especially the questioning behaviors of teachers. Sanders, and Gallagher and Aschner successfully adapted the categories of Bloom and Guilford, respectively, to produce systematic approaches that effectively identify the cognitive levels of teacher questions in the classroom setting (9, 54, 96, 48, 31).

From 1950 to 1970 research on teachers' questioning behaviors went through a transition. The focus on identifying the cognitive emphasis of questions continued. The major change was researchers' use of increasingly sophisticated methods of systematic observation. Another thrust was devising and testing training programs using systematic observation techniques to provide pre-service and in-service teachers with questioning skills. The training focused primar-

ily on raising questioning levels to better conform to desired student thought levels. Other research efforts began to determine the impact of teacher questioning behaviors on student learning outcomes. This research continues and will continue well into the 1980's largely because of public concern for teacher accountability.

Current Research Trends

The current period of research activity on questioning began with several major reviews of studies conducted since the turn of the century. Hoetker and Ahlbrand concluded that classroom verbal behavior patterns, as indicated by research dating back to 1912, have been extremely stable. Concerning the finding that teachers have persisted in asking low-cognitive-level questions, the authors challenged the theorists by suggesting that teachers may be right in continually using the recitation method (59). Gall concluded after his review that training teachers to improve questioning practices should now become the focus of research because the function of questions is to produce desired changes in student behavior (42). Determining the impact of teacher questions on student learning outcomes is the major emphasis of questioning research today. In his review of correlational studies of teaching skills and student achievement, Rosenshine found no clear relationship between higher-level questioning and student achievement. He did, however, find a possible relationship of certain questioning skills (high interaction and probing) to achievement (89).

The phases of research on questioning parallel the cycles of research on teaching effectiveness described by Rosenshine, and, to an extent, Medley. The first two cycles identifying teacher characteristics and systematically observing teacher behavior have provided a transition to the third phase. The concern of researchers now focuses on the specific questioning levels and skills that have an impact on student growth, particularly cognitive growth (91, 78).

These research findings are discussed in more detail in the next two sections of this book, "Teachers' Questioning Practices" and "Impact of Questioning on Learning Outcomes."

TEACHERS' QUESTIONING PRACTICES

Function of Questions

The questions teachers regularly ask reflect their short- and long-range decisions about students, instruction, and curriculum. In a very basic sense, the kinds of questions teachers ask and the techniques they employ to interact with students imply their philosophy

Table 1

QUESTIONING TECHNIQUES

1. *Plan key questions to provide lesson structure and direction.* Write them into lesson plans, at least one for each objective—especially higher-level questions. Ask some spontaneous questions based on student responses (50, 53, 67, 96, 113).
2. *Phrase questions clearly and specifically.* Avoid vague or ambiguous questions such as "What did we learn yesterday?" or "What about the heroine of the story?" Ask single questions; avoid run-on questions that lead to student frustration and confusion. Clarity increases probability of accurate responses (25, 50, 53, 67).
3. *Adapt questions to student ability level.* This enhances understanding and reduces anxiety. For heterogeneous classes, phrase questions in natural, simple language, adjusting vocabulary and sentence structure to students' language and conceptual levels (50, 53).
4. *Ask questions logically and sequentially.* Avoid random questions lacking clear focus and intent. Consider students' intellectual ability, prior understanding of content, topic, and lesson objective(s). Asking questions in a planned sequence will enhance student thinking and learning (50, 53).
5. *Ask questions at variety of levels.* Use knowledge-level questions to determine basic understandings and to serve as a basis for higher-level thinking. Higher-level questions provide students opportunities to practice higher forms of thought (50, 53, 67, 113).
6. *Follow up student responses.* Develop a response repertoire that encourages students to clarify initial responses, lift thought to higher levels, and support a point of view or opinion. For example, "Can you restate that?" "Could you clarify that further?" "What are some alternatives?" "How can you defend your position?" Encourage students to clarify, expand, or support initial responses to higher-level questions (25, 67, 113).
7. *Give students time to think when responding.* Increase wait time after asking a question to three to five seconds to increase number and length of student responses and to encourage higher-level thinking. Insisting upon instantaneous responses significantly decreases probability of meaningful interaction with and among students. Allow sufficient wait time before repeating or rephrasing questions to ensure student understanding (17, 50, 53, 67, 94).
8. *Use questions that encourage wide student participation.* Distribute questions to involve majority of students in learning activities. For example, call on nonvolunteers, using discretion for difficulty level of questions. Be alert for reticent students' verbal and nonverbal cues such as perplexed look or partially raised hand. Encourage student-to-student interaction. Use circular or semicircular seating to create environment conducive to increased student involvement (17, 25, 50, 53, 113).
9. *Encourage student questions.* This encourages active participation. Student questions at higher cognitive levels stimulate higher levels of thought, essential for inquiry approach. Give students opportunities to formulate questions and carry out followup investigations of interest. Facilitate group and independent inquiry with a supportive social-emotional climate, using praise and encouragement, accepting and applying student ideas, responding to student feelings, and actively promoting student involvement in all phases of learning (17, 64, 67, 113).

achieve an objective (66).

Before devising or selecting a questioning strategy, teachers should first consider the function of the strategy. Hunkins suggests four major functions for grouping questions into strategies: centering, expansion, distribution, and order (65). The centering function guides the teachers in focusing students' attention on the learning material at a particular cognitive level. This function is especially appropriate at the beginning of a lesson when the teacher has students focus on the topic, problem, or issue. Centering can occur at any cognitive level. For example, a teacher reads a newspaper account of a woman, employed by the ABC Electronics Company, who has recently brought a lawsuit against the company charging discrimination in promotion practices. A centering question to initiate inquiry on the article is "What are the facts in this case?"; a higher-level, followup question, "What do you perceive to be the problem?" Other centering questions that can help guide the investigation are "What terms need to be clarified?" and "What are some data sources you could use to gather information?" (65).

The expansion function helps students extend their thought at the same cognitive level or raise it to another level. Using the illustrative lesson, the following questions extend divergent thinking: "What are some other factors that might cause high officials in ABC Electronics to purposely keep women from advancing in rank?" and "Are there some other value conflicts to consider?" Expansion questions lifting students' thinking to higher levels include "Now that you have gathered and analyzed some data, can you offer any tentative solutions?" and "Of the ideas you have presented to help ABC Electronics eliminate discriminatory practices, which do you think best?" (65).

The distributive function, along with the ordering function, is used with the centering and expansion functions. Its purpose is to encourage as many students as possible to participate in the learning activity. Questions serving this function are "Judy, what do you think of Neal's opinion?" and "Fred, you've uncovered some interesting information. Could you share it with Marlene because she is having some trouble locating data on this aspect of the problem?" (65).

The order function physically manages and emotionally supports students in order to maintain an appropriate classroom atmosphere. Questions to physically order the class and promote the inquiry process include "What rules must students follow when using the instructional resources center?" and "If you continue acting that way, how will it affect the others in your group?" A question providing emotional support: "You seem to be having a problem. What can I do to help you locate the information?" (65).

In a series of three books, Weil, Joyce, and Kluwin offer teachers the knowledge and skills to apply eight alternative instructional

strategies: concept attainment (13), inquiry training (105), advance organizer (4), synectics (51), the nondirective model (88); role-playing (98), the jurisprudential model (82), and social simulation (11). These strategies are organized into three families of teaching models—information processing, social, and personal—and each strategy represents distinct assumptions about student learning and teachers' instructional roles. Each one is interactive—that is, teachers ask questions and students respond to achieve specific objectives—and the relationship of the effective use of questions to selected strategies is evident (110, 109, 108).

Analyzing Questions

The systematic observation and analysis of classroom interaction is a relatively recent phenomenon. Anderson developed one of the first systems when he investigated the dominative and integrative behavior of teachers (2). Subsequent efforts by Withall and Flanders contributed greatly to understanding teacher and student behaviors that influence classroom and social-emotional climate (118, 40).

Teacher questioning behavior is analyzed through observation and collection of objective data on such aspects of questions as cognitive level, length, and frequency. Systematic observation techniques can also record and categorize the verbalizations preceding and following questions as well as many characteristics of student responses (99). One of the more recent reviews of this topic identified 21 classification systems for classroom questions (87). Most focused on the cognitive levels.

Although questions were formally classified according to cognitive levels as early as 1860, not until the Stevens study in 1912 were they categorized for research purposes. This study classified questions recorded by stenographers according to those stimulating memory and reflection, with particular emphasis on those eliciting comparisons and judgments from students (104). Not until the mid-1950's through the efforts of Bloom and Guilford were researchers provided explicit criteria for identifying and analyzing classroom thinking operations. The purpose of Bloom's research was to provide a classification scheme of the intended goals of education, with emphasis on developing educational objectives in the cognitive domain. He identified six major hierarchical classes of objectives, or educational behaviors, ranging from simple to complex intellectual abilities and skills: knowledge, comprehension, application, analysis, synthesis, and evaluation (9). Sanders adapted Bloom's classification to his study of questions by dividing the comprehension category into translation and interpretation because of the distinct kinds of thinking involved, and retitling the knowledge category "memory" (96).

During the period that Bloom devised his Taxonomy, Guilford developed his Structure of Intellect model, classifying intellectual factors several ways. One basis of classification is by the mental operations performed broken down into five major groups: cognition, memory, convergent thinking, divergent thinking, and evaluation (54). Based on Guilford's model, Gallagher and Aschner constructed a category system to examine teacher-student classroom interaction. Their major adaptation was to combine the cognition and memory categories because of the similarity of mental operations required:

1. **Cognitive-Memory**—students mentally reproduce facts, formulas, or other remembered content through use of such processes as recognition, rote memory, and selective recall.
2. **Convergent Thinking**—students analyze and integrate given or remembered data. The outcome is one expected end result or answer because of the tightly structured framework through which the individual must respond.
3. **Divergent Thinking**—students generate independently their own information within a data-poor situation, or take a new direction or perspective on a given topic.
4. **Evaluative Thinking**—students deal with matters of judgment, value, and choice. (48, pp. 186-88)

Table 2 contains sample questions teachers might ask in their classrooms categorized according to the Sanders and the Gallagher-Aschner systems. Because the convergent thinking category of the Gallagher-Aschner system is so broad, encompassing four categories of the Sanders system (translation, interpretation, application, and analysis), an adaptation was made classifying questions as low convergent and high convergent. The primary difference is that analysis questions are higher level and therefore stimulate more open-ended student responses (95).

To simplify question classification and make self-analysis of teacher behavior easier, Enokson devised an approach that combines the principles of the Bloom and Guilford systems (35). The main advantage of this approach over other systems, including Bloom's and Guilford's, is that it requires little formal training to learn and apply the categories: Teachers can classify a question according to two separate parameters: cognition, based on Bloom's Taxonomy and nature, based on Guilford's structure of intellect. Both parameters are considered interrelated and function simultaneously at different levels. Thus, questions can be classified according to their nature and cognition as convergent-low, convergent-high, divergent-low, and divergent-high, depending on whether facts are recalled or integrated and whether the question has only one possible answer or

Table 2
**SAMPLE QUESTIONS CATEGORIZED ACCORDING TO SANDERS
 AND GALLAGHER-ASCHNER (ADAPTED) SYSTEMS**

QUESTION	SYSTEM	
	Sanders based on Bloom	Gallagher-Aschner (based on Guilford)
Who invented the sewing machine?	Memory	Cognitive-Memory
What is the definition for photosynthesis?	Memory	Cognitive-Memory
How many colors are on the chart?	Memory	Cognitive-Memory
In your own words, according to the story, how did the dog get loose?	Translation	Convergent (Low)
How would you say this in German?	Translation	Convergent (Low)
What is the meaning of this political cartoon?	Translation	Convergent (Low)
How would you compare the climates of Miami and San Francisco?	Interpretation	Convergent (Low)
What are the similarities between these two points of view?	Interpretation	Convergent (Low)
How are these three members related?	Interpretation	Convergent (Low)
According to our definition of revolution, which of the following conflicts would be considered revolutions?	Application	Convergent (Low)
How would you solve this problem using the accounting procedure provided?	Application	Convergent (Low)
What is an example of cooperation in your home?	Application	Convergent (Low)
Why did the girl run away from home?	Analysis	Convergent (High)
Now that you have completed the experiment, what is your conclusion as to why the substance became denser?	Analysis	Convergent (High)
What evidence can you provide to support your view that the constitutional power of the president has diminished over the years?	Analysis	Convergent (High)
How can we raise money to support the recycling center?	Synthesis	Divergent
Suppose that England had won the American War for Independence, how might pioneers' movement to the west have been affected?	Synthesis	Divergent
What is a good title for this story?	Synthesis	Divergent
Did you think the plot of this novel was well developed?	Evaluation	Evaluation
What is your favorite orchestral instrument?	Evaluation	Evaluation
How would you rate the effectiveness of the Environmental Protection Agency?	Evaluation	Evaluation

different possible answers (35). Table 3 contains examples of questions illustrating the application of this model.

Table 3
**SAMPLE QUESTIONS
 CATEGORIZED ACCORDING TO ENOKSON'S SYSTEM**

QUESTION	CLASSIFICATION
What is the definition of pollution?	Convergent-low
Based on the account of a hypothetical city you have just read, which form of pollution most seriously threatens the people?	Convergent-high
What are some of the approaches suggested by the EPA to solve major air pollution problems?	Divergent-low
How might we devise a plan to significantly reduce the city's air pollution problem?	Divergent-high

Knowledge and skill in classifying questions can help teachers determine the degree of student thinking being stimulated. This identification and subsequent analysis can ultimately help them ascertain if course goals and lesson objectives are being met.

Types of Teacher Questions

Although a wide range of questioning is possible and recommended, research has consistently demonstrated teacher preference for low-cognitive-level questions typically categorized at the memory level. Since Stevens's first systematic study on questioning (104), this finding has been verified at all grade levels in a variety of subject areas.

Floyd classified the verbal questioning behavior of 40 elementary teachers and found them asking 93 percent of all classroom questions. Forty-two percent of the questions were on the memory level; only 6 percent stimulated high-level thinking (41). Observing 14 science lessons in five elementary schools, Moyer concluded that teachers are consistent in the types of questions they ask and are not encouraging critical thinking in their classes (81). This finding was supported by Blosser's review of observational studies of science classrooms: science teachers operate primarily at the cognitive-memory level at both the elementary and secondary levels (10). (See sample questions in Table 2.)

Investigating the question levels of reading teachers in second, fourth, and sixth grade classrooms, Guszak found the greatest portion were on the recall and recognition levels with emphasis on literal comprehension (55). In a junior-high-level study of teacher-pupil

interaction in English classes, Hudgins and Ahlbrand found students operating at the cognitive-memory level 80 percent of the time (62). At the secondary level, Gallagher studied 235 students in junior high and high school gifted classes, and concluded that the basis of classroom discourse was at the cognitive-memory level. The next most frequently used level was the convergent level (47). (See sample questions in Table 2.)

Observing secondary school social studies student teachers, Davis and Tinsley found the emphasis on the memory level and more questions at this level than at all others combined. These researchers found the conclusions distressing because of the assumed emphasis of critical thinking in the social studies (29). In their three-year study of social studies student teachers, Barth and Shermis found only 14 of 30 student teachers taped before and after student teaching asking questions associated with the inquiry process—even though they had received training in inquiry teaching. The authors hypothesized that, despite experience with higher-level questioning and inquiry strategies in their methods courses, the student teachers may not have fully comprehended the theory of inquiry (reflective) teaching. They also hypothesized that the student teachers may not have been supported by their supervising teachers in their efforts to demonstrate higher-level questioning (6).

The overall conclusion that teachers have persisted in using low-cognitive-level, primarily memory, questions applies also to the questions used for lesson plans and examinations. Pfeiffer and Davis categorized the questions contained in teacher-made semester examinations for all ninth grade courses at one junior high school, concluding, "The teacher-made examinations . . . clearly emphasized the objective of knowledge acquisition and the mental process of memory." (85, 10). In another study, 67 student teachers, upon completing their experience, composed discussion and test questions for hypothetical eighth and eleventh grade American history classes. When the questions were categorized, the data revealed no differentiation in the questions planned for tests and discussions, or in those planned for junior and senior high school students. Moreover, more evaluation and memory questions were planned than all other types. Thus, the authors concluded that questions composed for secondary school students provided very little variety or opportunity to engage in critical thinking processes and skills (107).

IMPACT OF QUESTIONING ON LEARNING OUTCOMES

Student Thinking

Ever since the first studies of teacher-student interaction were conducted, a major assumption of educators and researchers has been that a direct and positive relationship exists between the cognitive levels of teacher questions and the thinking levels of student responses. The research findings on this presumed relationship are mixed, however.

Taba's research project studied the developmental effects of a specially designed curriculum and instructional program on student thinking skills. She found that teaching strategies which involved extensive questioning were the most important single influence on students' cognitive performance. Specifically, the research data clearly demonstrated that "the nature of the questions has a singular impact on the progression of thought in the class. The questions teachers ask set the limits within which students can operate and the expectations regarding the lack of cognitive operations." (106, p. 177). At about the same period, Gallagher and Aschner were attempting to identify and describe the kinds of thinking exhibited in the classroom. Using gifted students at the junior and senior high levels, they found the basis of classroom discourse to be cognitive-memory-level teacher questions and student responses. As for higher-level thinking, they found that a 5 percent increase in divergent-level questions initiated a 40 percent increase in divergent responses from students. Their conclusion: the teacher controls the thought levels in the classroom (48, 47). More recently, a study of student teachers in elementary science by Arnold, Atwood, and Rogers also found the question level significantly related to the response level (3).

The results of two other studies were inconsistent with these findings (71, 79). Exposing students to three treatments of 65 percent higher-level teacher questions, 50 percent higher- and lower-level questions, and 65 percent lower-level questions, Konya found that students responded more often at higher levels when teachers asked equal amounts of higher- and lower-level questions (71). More recently, Mills and others reanalyzing the data from an earlier study (43) found only about a 50 percent relationship between teacher questions and student responses. Mills concluded, "The result provides a firm basis for dispelling the belief that there is a high correlation between types of teacher questions and types of student answers. It appears that training teachers to ask higher cognitive questions is not adequate in itself to insure comparable levels of student cognitive

performance." (79, p. 200).

In response to the recent finding that question and response levels are not highly related, Winne and Marx suggest that student perceptions of the thinking required by higher cognitive questions differ from teacher intentions as indicated by the questions asked (116). If this is the case, it could very easily result in a lack of relationship between responses and questions. Mills and others recommended training teachers to incorporate interaction techniques focusing on verbal cues to help students become aware of the thought processes required to respond appropriately. Further, they suggested training students in an approach to question classification to help them more easily play the higher cognitive discussion "game" (79).

Essential to student thinking, especially at the higher cognitive levels, is the time the teacher allots for the student to respond after asking a question. Stevens reported a lack of pausing skills, commonly called "wait time," "think time," and "lapse time." The teachers she investigated asked questions at a rate of two to three per minute (104, p. 16).

Concern for the time allotted students to reflect before responding to teacher questions prompted Rowe to investigate wait time. In the first part of the study, Rowe found the mean wait time to be one second after the teacher asked a question and the student responded. If the student did not respond in one second, the teacher either repeated or rephrased the question, asked another question, or called on another student. After receiving a response, the average teacher waited only 0.9 seconds before reacting or asking another question (94).

The second part of Rowe's study demonstrated the potential of wait time as an important teacher skill to aid students' higher cognitive processes. After teachers had been trained to increase their wait time to three to five seconds, Rowe's analysis of over 900 tapes of these teachers produced the following conclusions: (1) increased length of student responses; (2) increased number of unsolicited appropriate responses; (3) decreased number of failures to respond; (4) increased student confidence in responding; (5) increased speculative thinking; (6) decreased teacher-centered teaching, increased student-student interaction; (7) more student-provided evidence preceding or following inference statements; (8) increased number of student questions; (9) increased contributions of slow students; (10) increased variety of student structuring, soliciting, and reacting moves. Rowe also found that teachers developed greater response flexibility, changed the number and kind of questions they used, and tended to wait longer for responses from more capable students (94). Recently Hassler supported these findings in language arts (58).

Based on efforts at the University of Maryland Reading Clinic to

increase the amount of wait time, Gambrell suggests several steps for teachers to consider:

1. *Teacher preparation.* Silently count up to five seconds after asking a question to help establish a routine to use wait time.
2. *Student preparation.* Tell students that wait time will be extended.
3. *Begin slowly.* At first, plan to use wait time during a specific part of a lesson, especially a part emphasizing higher-level thinking (49).

Student Achievement

A major concern of teachers today is the impact of their verbal and written questions on student learning outcomes as measured primarily by achievement tests. Only within the last two decades have a growing number of studies provided some tentative conclusions.

Very few studies have compared the effects of written and oral teacher questions. In a study involving 179 high school students, Rothkopf found better instructional results obtained from students who were questioned by teachers during individual study time compared to those who responded to written questions from a science text (93). In his review of the literature, Hargie concluded that teachers' oral questions are more effective than written questions (57).

Another important area is the relationship of the frequency of teacher questions and student learning. In his first major review of correlational studies on teaching behaviors and student achievement, Rosenshine found that a high frequency of interaction related significantly to achievement. But he did not find a relationship between higher-level questions and achievement (89). This conclusion is puzzling considering some of the research that seemed to support the positive relationship between higher-level teacher questions and high-level student responses. In a later study, Rosenshine found further support for the lack of relationship between the frequency of higher-level questions and achievement. Additionally, the frequency of factual single-answer questions was positively related to student achievement. This finding was based on studies that focused on basic skill instruction in reading and mathematics for first through fifth graders (91). Good and Brophy offered three reasons for the relationship between the frequency of low-level questions and learning gains: (1) teachers who have high frequencies of questions plan and organize well, and therefore have few classroom management problems; (2) they heavily involve their students in academic activities leaving little time for them to pursue nonacademic goals; (3) they probably also involve their students in a variety of oral participation instructional approaches (50).

Although the frequency of higher-level questions appears unrelated to achievement, several studies found that verbalized higher-level questions lead to greater achievement than do low-level questions. Kleinman studied 23 teachers and their seventh and eighth grade general science students to determine, in part, whether the kinds of teacher questions influence student understanding of science. She found that students of teachers who asked higher-level critical thinking questions performed better on a science achievement test than students of teachers who asked questions requiring recall of information (69). Also using junior high science teachers and students (ninth grade), Ladd found that teachers who asked a greater proportion of higher inquiry questions, as compared to those who asked low inquiry questions, caused greater change in student achievement as indicated on a posttest composed of low and high inquiry questions (73). Investigating the relationship between knowledge-level and higher-level social studies questions and achievement on tests, Bugey concluded that significantly greater achievement was made by second grade students in the treatment group whose teachers asked 70 percent higher-level questions and 30 percent knowledge-level questions (14). Savage found no differences in his replication of Bugey's study with fifth graders. He concluded that at the fifth grade level, students' thought was not as dependent upon teacher questioning style as it was at the second grade level (97).

Three more recent studies of middle-school-age students produced mixed conclusions about the positive influence of higher-level questioning. Gall and others, using sixth grade classes, found that treatment group teachers asking 25 percent higher cognitive questions outperformed two other groups using 50 percent and 75 percent higher cognitive questions on knowledge acquisition and higher cognitive written and oral tests. Discussions guided by 50 percent higher cognitive questions were found to be the least effective in stimulating recall of information (45). Wilson examined the processing strategies of average and below-average sixth and seventh grade readers in response to factual and inferential questions. She found that average readers outperformed below-average readers in response to inferential questions but not in response to factual questions on the majority of reading passages (115). In the third study, Evenson found that treatments of 70 percent higher-cognitive-level questions facilitated fifth and sixth graders' recall of content but were ineffective in developing higher-level understandings. She also found that student achievement was significantly better in competitive instructional environments as compared to cooperative environments (36). Evenson's second finding tends to support Kniep and Grossman's conclusion that fifth graders in competitive instructional environments performed better on high-cognitive-level tests than

students in cooperative environments. In both environments teachers asked high-level questions and student achievement was measured at the recall and higher cognitive levels (70).

As with any relatively new area of educational research, studies with opposing findings can be expected. During the past decade several investigators have examined the research on the relationship of teaching behaviors and student achievement focusing on the impact of teachers' questioning behaviors. Rosenshine followed up his earlier review of correlational studies (89) with an in-depth review of three major studies on classroom instruction (90). Although he found no clear relationship between teacher use of higher-cognitive-level questions and student achievement in 1971, data from three extensive studies conducted by other researchers (102, 103, 12) since then led him to conclude that there was a positive relationship between lower-cognitive-level questions and achievement and a lack of a relationship between higher-level questions and achievement. The common aspect of these three studies was the use of primary grade teachers with low socioeconomic-status students and an emphasis on learning outcome measures in reading and mathematics (90). In 1979 Rosenshine expanded his interpretation of the findings of the three studies by concluding that "open-ended questions, questions about personal experience, and questions about opinions were negatively correlated with achievement" (91, p. 45).

In another view, Winne carefully examined 18 studies of pre-schoolers through twelfth graders in a variety of subject areas to determine if teacher use of higher cognitive questions was related to student achievement. According to Winne, the findings "indicate that whether teachers use predominantly higher cognitive questions or predominantly fact questions makes little difference in student achievement" (117, p. 43). He suggested that more research is needed on the impact of higher cognitive questions on student cognitive processes.

After a teacher asks a question and a student responds, several followup options are available. The teacher can reward the student positively or negatively depending on whether the response is acceptable or unacceptable; probe with a followup question to encourage the student to restate or clarify, elaborate, expand, or support the response; redirect the question to another volunteering or nonvolunteering student; or ask a related question. Very little research has been conducted on the impact of teacher followup questions on student outcomes and the findings that are available are mixed.

In a study of third graders, Wright and Nuthall found a significant positive relationship between teacher questions asked one at a time and achievement. Students of teachers who asked two or more questions without a pause did not achieve as well (119). In a recent

study, Land found teacher clarity significantly related to student achievement on a test made up of low-level questions (74). Wright and Nuthall also found a positive relationship between the percentage of teacher questions answered by students and achievement. Negatively correlated with achievement was the frequency with which teachers provided information immediately following their own questions. The frequency of teachers' probing questions requiring students to elaborate, expand, or explain responses, according to Wright and Nuthall, had no relationship to achievement. But the frequency of questions redirected to other students was significantly related to achievement (119). Using sixth graders, Gall and others supported the findings that probing did not relate to achievement, but they also found, in contradiction, that redirection did not increase achievement or higher-cognitive-level oral or written responses (45).

Student Attitudes

The learning outcome receiving the least attention by educational researchers—concerning the impact of teacher questioning behavior—is student attitudes. Students may reflect their disposition toward responding to teacher questions at a variety of cognitive levels, as well as toward teacher use of specific questioning techniques, in their feelings, opinions, and preferences. For example, students with a negative attitude toward teacher questioning behaviors may possibly exhibit it in their behavioral patterns, academic performance, and/or perception of teacher and subject.

Several studies have investigated the influence of the discussion method on student attitudes, and student preferences for the cognitive levels of teacher questions. Fisher found that reading literature changed fifth graders' attitudes toward the topic (Indians), and involving students in a discussion after reading significantly increased attitude change more than reading alone (38). Gall and others also found a relationship between questions and the positive attitudes of sixth graders. Using six attitude measures, these researchers found written and discussion questions equally effective in stimulating positive attitudes toward the topic (ecology) and toward discussion as an instructional method. They also found that higher cognitive questions did not affect student attitudes (44).

Considering preferences a major indication of student attitudes, Wilen investigated student preferences for the cognitive levels of their teachers' verbal questioning behavior and the relationship of preferences to test score gains. In this study, American history students were exposed to four treatments of questioning corresponding to the Gallagher-Aschner question levels. Students failed to indicate a preference for higher-level questions, and those who preferred

low-level questions performed best on written tests incorporating such questions. Wilen concludes that students must develop positive attitudes toward higher-level questioning if instructional approaches such as inquiry are to be effective (112, 114).

IMPROVING QUESTIONING PRACTICES

Once the importance of teacher questions as a stimulus to student thinking and learning was realized, the development of instructional improvement programs to acquaint and train pre-service and in-service teachers in questioning skills was inevitable. This thrust became apparent during the 1960's when research efforts had convincingly demonstrated that teacher questions persistently demanded primarily low-cognitive-level thinking. Thus, researchers and teacher educators, and later some commercial producers, devised instructional improvement programs to train teachers to increase question frequency, raise cognitive emphasis, phrase questions properly, develop probing and redirection skills, and increase wait time. These training programs often incorporated typescripts of classroom dialogues, simulations of teaching, and audio and videotapes to provide realism in identifying, analyzing, and practicing questioning behaviors.

Many researchers and educators have been generally successful in their attempts to change teachers' questioning behaviors, especially in raising cognitive levels. Although Houston conducted one of the first successful in-service training programs in the 1930's (61), it was not until the 1960's that a wide range of effective training programs was developed and tested. Using Bloom's Taxonomy to introduce the cognitive levels, Clegg and his associates found that in-service and student teachers significantly altered their questioning behaviors by achieving higher cognitive levels in the classroom (20, 37). Also using Bloom's Taxonomy in an individualized in-service approach, Zoch found that his experimental group of kindergarten and first grade teachers asked a greater percentage of higher-level questions (121). Using videotaped lessons as the means of instruction with Gallagher and Aschner's classification scheme, Cunningham found that pre-service elementary science teachers significantly decreased the proportion of cognitive-memory-level questions and significantly increased the proportion of divergent-level questions after instruction (26). After an in-service program on questioning skills, Psencik found American history teachers asking more above-memory-level questions (86). Crump developed and used learning packages to successfully alter intermediate social studies teachers' oral and written questioning behaviors (28). More recently, Wright

found a microteaching program the most effective technique for secondary methods students to increase questioning levels (120).

Not all training programs have been equally successful. Douce trained an experimental group of first through tenth grade teachers in questioning techniques using learning packages. After instruction, the teachers did not ask significantly more or higher-level questions. Douce concluded that teachers with experience found it more difficult to change their questioning behaviors than did student teachers (34). In another program, Welch found that social studies student teachers asked fewer higher-level questions after reading and being tested on Sanders's approach to question classification (111).

The Far West Laboratory for Educational Research and Development has produced and successfully tested a program available to teachers to assist in developing questioning skills. This minicourse is a self-contained in-service training program that uses, in part, microteaching. Several versions have been produced and found effective (42). Using the minicourse approach, Pagliaro trained student teachers and cooperating teachers to determine if the questioning behaviors of the former changed as a result of placement with the latter. She found that student teachers who displayed low scoring levels of questioning behaviors prior to their student teaching experience, scored significantly higher when placed with cooperating teachers who displayed high scoring levels of questioning behaviors (83). Buttery and Michalak also used the minicourse approach to train elementary-level student teachers. Using a clinical supervision process, they found the experimental group significantly improved in eleven questioning skill areas, as compared with a control group that improved in only two areas (16). In another interesting study, Malvern found that students of in-service teachers with training in the minicourse approach improved their inferential thinking skills over students of teachers without such training (76).

Realizing that a systematic approach to improving instruction can be threatening when conducted by those outside the classroom, and can also be time-consuming, Kindsvatter and Wilen developed a practical and effective approach for teachers. The Improving Classroom Instruction (ICI) approach focuses on a variety of instructional skill areas, including cognitive levels and phrasing of questions. Teachers can use it as either a shared-analysis approach with a colleague, or a self-analysis approach in conjunction with a video or audiotape recording. The self-analysis approach is a particularly nonthreatening and convenient way for teachers to identify and analyze their question-phrasing behaviors and the cognitive levels of questions they use. The following steps are recommended for applying the ICI self-analysis approach:

1. Become familiar with question-phrasing techniques and four

cognitive levels of questions.

2. Teach an instructional episode or class using questioning behaviors with an audio or videotape being made.
3. Identify and analyze questioning behaviors by completing the analysis form (see Figure 1) and using the taped playback.
4. Repeat steps 2 and 3 if skills need further improvement.

A unique feature and advantage of the ICI approach as its two-dimensional analysis. The form includes two columns: "Occurrence," for recording the extent to which each component is evident, and "Effectiveness," for estimating the teacher's performance skill. These two kinds of data—descriptive and evaluative—contribute to a comprehensive analysis (68).

Another practical and beneficial method for teachers to gather information on their questioning behaviors is to have their students act as observers and data gatherers. As Hogg and Wilen suggest, students can be a practical and reliable source of feedback on teacher performance because they observe the teacher in action many hours each week (60). As observers, students provide a large sample, thereby reducing individual biases and increasing reliability. Systematic student observation of teachers is inexpensive, requires little time, and fits well into the classroom schedule. Secondary students can be easily trained to identify four cognitive levels of questions, perhaps using the Gallagher-Aschner approach, while intermediate students can become acquainted and practice with two levels such as convergent (closed) and divergent (open-ended) questions. A data gathering form incorporating space for students to record verbatim questions and to categorize them is quite simple to construct (60). Hunkins suggests several techniques to involve students in identifying and analyzing teacher questions (64).

CONCLUSION

Although there are conflicting findings and differing viewpoints in the research concerning the effective use of questions, most researchers, teachers, and educators would agree with DeGarmo's assertion that "to question well is to teach well" (32, p. 179). If teachers or students were polled to identify the factors they considered essential to good teaching, the common thread running through their responses would be the teacher's personal and intellectual relation to students through interaction. In a word, the common thread would be communication. Since communication is an essential of teaching, and questioning is an integral part of classroom verbal interaction, to a substantial degree teacher effectiveness is affected by questioning skill.

QUESTIONS AND QUESTIONING: ANALYSIS FORM*

Figure 1

Teacher _____ Class _____

Topic _____

ANALYSIS SCALES

Occurrence	Effectiveness
1. Not evident	1. Not effective
2. Slightly evident	2. Slightly effective
3. Moderately evident	3. Moderately effective
4. Quite evident	4. Quite effective
N Not Applicable	N Not applicable

PHRASING:

1. APPROPRIATE QUESTION LEVEL: Teacher used question at appropriate levels to achieve the objectives of the lesson.	Extent	Appraisal
2. ALLOWS THINKING TIME: Teacher paused sufficiently after asking higher-level questions in order to allow student thinking.	_____	_____
3. GROUP-INDIVIDUAL BALANCE: Teacher provided a balance between group-oriented and individual student questions.	_____	_____
4. PARTICIPATION: Teacher encouraged participation by calling on volunteers and nonvolunteers.	_____	_____
5. FOLLOWUP QUESTIONS: Teacher followed up initial student responses with questions that encouraged students to complete, clarify, expand, or support.	_____	_____
6. APPROPRIATE VERBAL LEVEL: Teacher adjusted questions to the language and ability level of the students.	_____	_____

COGNITIVE LEVELS:

1. COGNITIVE-MEMORY: Narrow, closed questions that require students to recall or recognize information. Students recognized, recalled, defined, recounted, repeated, quoted, identified, or answered yes or no.	# Questions Asked	Est. % of Total
2. CONVERGENT: Narrow questions that require students to analyze and combine remembered information. Students translated, interpreted, analyzed, associated, concluded, or summarized.	_____	_____
3. DIVERGENT: Broad, open-ended questions that require students to develop their own information or to view a topic from a new perspective. Students hypothesized, speculated, devised, inferred, predicted, implied, synthesized, or solved.	_____	_____
4. EVALUATIVE: Broad, open-ended questions that require students to judge, value, or choose with support from internal or external sources. Students opined, judged, rated per an explicit criterion, or made and defended a choice.	_____	_____

Total Number of Questions Asked _____

*Kindsvatter and Wilen (68, p. 313).

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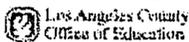
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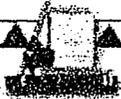
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Reading: Basic to Success

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What is Reciprocal Teaching?

Reciprocal teaching is an instructional procedure designed to enhance students' comprehension of text. The procedure was designed by Anne Marie Palincsar, from Michigan State University and Anne Brown, from the University of Illinois. It is characterized by:

RECIPROCAL TEACHING



- a dialogue between students and teacher, each taking a turn in the role of dialogue leader;
- "reciprocal": interactions where one person acts in response to the other;
- structured dialogue using four strategies: questioning, summarizing, clarifying, predicting.

Why were these four strategies selected?

Each of these strategies helps students to construct meaning from text and monitor their reading to ensure that they are in fact understanding what they read. Students may find the set of cards developed by Kathie Babigian, helpful to guide their questioning process

Summarizing. This strategy provides the opportunity to identify, paraphrase, and integrate important information in the text.

Questioning. When students generate questions, they first identify the kind of information that is significant enough that it could provide the substance for a question. Then they pose this information in a question form and self--test to ascertain that they can indeed answer their own question.

Clarifying. When teaching students to clarify, their attention is called to the many reasons why text is difficult to understand; for example new vocabulary, unclear referent words, and unfamiliar or difficult concepts. Recognizing these blocks to understanding signals the reader to reread, read ahead, or ask for help.

Predicting. This strategy requires the reader to hypothesize about what the author might discuss next in the text. This provides a purpose for reading: to confirm or disapprove their hypotheses. An opportunity has been created for the students to link the new knowledge they will encounter in the text with the knowledge they already possess. It also facilitates the use of text structure as students learn that headings, subheadings, and questions imbedded in the text are useful means of anticipating what might occur next.

How are the four strategies used in a session?

The discussion leader generates questions to which the group responds. Additional questions are raised by other members of the group. The leader then summarizes the text and asks other members if they would like to elaborate upon or revise the summary. Clarifications are discussed. Then, in preparation for moving on to the next portion of text, the group generates predictions. The goal is flexible use of the strategies.

How are the four strategies introduced to students?

- During the initial phase of instruction the teacher assumes primary responsibility for leading the dialogues and implementing the strategies.
- Through modeling the teacher demonstrates how to use the strategies while reading text.
- During guided practice the teacher supports students by adjusting the demands of the task based on each student's level of proficiency.
- Eventually the students learn to conduct the dialogues with little or no teacher assistance.
- The teacher assumes the role of a coach/facilitator by providing students with evaluative information regarding their performance and prompting them to higher levels of participation.

How should students be grouped for instruction?

Students should be taught in small heterogeneous groups to ensure that each student has ample opportunity to practice using the strategies while receiving feedback from other group members. The optimal group size is between six to eight students. Frequent guided practice is essential in helping students become more proficient in their use of the strategies.

What criteria should be used to select appropriate instructional materials?

- Select materials on the basis of the student's reading/listening comprehension level.
- Identify materials that are sufficiently challenging.
- Incorporate text that is representative of the kinds of materials students are expected to read in school.
- Generally students have been taught the Reciprocal teaching procedure using expository or informational text. The story structure in narrative text lends itself quite well. also.

Students are taught to use the four strategies incorporating the elements of story grammar (e.g., the setting, characters, plot, problem, and solution).

How much time should be allocated for instruction?

The first days of instruction are spent introducing the students to the four strategies. The length of each session will depend upon the age and the attention of the students but will usually fall within the range of 20 to 40 minutes per session. It is recommended that the initial instruction take place on consecutive days. After this point, instruction can be provided on alternate days if necessary.

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RECIPROCAL TEACHING

Developed by Annemarie Sullivan Palincsar

Rationale

DEFINITION

Reciprocal teaching refers to an instructional activity that takes place in the form of a dialogue between teachers and students regarding segments of text. The dialogue is structured by the use of four strategies: *summarizing*, *question generating*, *clarifying*, and *predicting*. The teacher and students take turns assuming the role of teacher in leading this dialogue.

PURPOSE

The purpose of reciprocal teaching is to facilitate a group effort between teacher and students as well as among students in the task of bringing meaning to the text. Each strategy was selected for the following purpose:

Summarizing provides the opportunity to identify and integrate the most important information in the text. Text can be summarized across sentences, across paragraphs, and across the passage as a whole. When the students first begin the reciprocal teaching procedure, their efforts are generally focused at the sentence and paragraph levels. As they become more proficient, they are able to integrate at the paragraph and passage levels.

Question generating reinforces the summarizing strategy and carries the learner one more step along in the comprehension activity. When students generate questions, they first identify the kind of information that is significant enough to provide the substance for a question. They then pose this information in question form

and self-test to ascertain that they can indeed answer their own question. Question generating is a flexible strategy to the extent that students can be taught and encouraged to generate questions at many levels. For example, some school situations require that students master supporting detail information; others require that the students be able to infer or apply new information from text.

Clarifying is an activity that is particularly important when working with students who have a history of comprehension difficulty. These students may believe that the purpose of reading is saying the words correctly; they may not be particularly uncomfortable that the words, and in fact the passage, are not making sense. When the students are asked to clarify, their attention is called to the fact that there may be many reasons why text is difficult to understand (e.g., new vocabulary, unclear referent words, and unfamiliar and perhaps difficult concepts). They are taught to be alert to the effects of such impediments to comprehension and to take the necessary measures to restore meaning (e.g., reread, ask for help).

Predicting occurs when students hypothesize what the author will discuss next in the text. In order to do this successfully, students must activate the relevant background knowledge that they already possess regarding the topic. The students have a purpose for reading: to confirm or disprove their hypotheses. Furthermore, the opportunity has been created for the students to link the new knowledge they will encounter in the text with the knowledge they already possess. The predicting strategy also facilitates use of text structure as students learn that headings, subheadings, and questions imbedded in the text are useful means of anticipating what might occur next.

In summary, each of these strategies was selected as a means of aiding students to construct meaning from text as well as a means of monitoring their reading to ensure that they are in fact understanding what they read.

RESEARCH BASE

For the past five years, Palincsar and Brown (1985a) have conducted a series of studies to determine the effectiveness of reciprocal teaching. The initial studies were conducted by adult tutors working with middle school students in pairs and by Chapter I teachers working with their small reading groups averaging five in number. The students were identified to be fairly adequate decoders but very poor comprehenders, typically performing at least two years below grade level on standardized measures of comprehension. Instruction took place over a period of 20 consecutive school days. The effectiveness was evaluated by having the students read passages about 450 to 500 words in length and answer 10 comprehension questions from recall. The students completed five of these passages before reciprocal teaching instruction began and one during each day of instruction. Performance on these assessment passages indicated that all but one of the experimental students achieved criterion performance, which we identified as 70 percent accuracy for four out of five consecutive days.

These results were in contrast to the group of control students, none of whom achieved criterion performance. In addition, qualitative changes were observed in the dialogue that occurred daily. For example, the experimental students functioned more independently of the teachers and improved the quality of their summaries over time. In addition, students' ability to write summaries, predict the kinds of questions teachers and tests ask, and detect incongruities in text improved. Finally, these improvements were reflected in the regular classroom as the experimental students' percentile rankings went from 20 to 50 and above on tests administered in social studies and science classes.

When the same instructional procedure was implemented in larger classes with groups ranging in

size from 8 to 18, 71 percent of the students achieved criterion performance as opposed to 19 percent of the control students who were involved in individualized skill instruction. Furthermore, teachers observed fewer behavior problems in their reciprocal teaching groups than in their control groups.

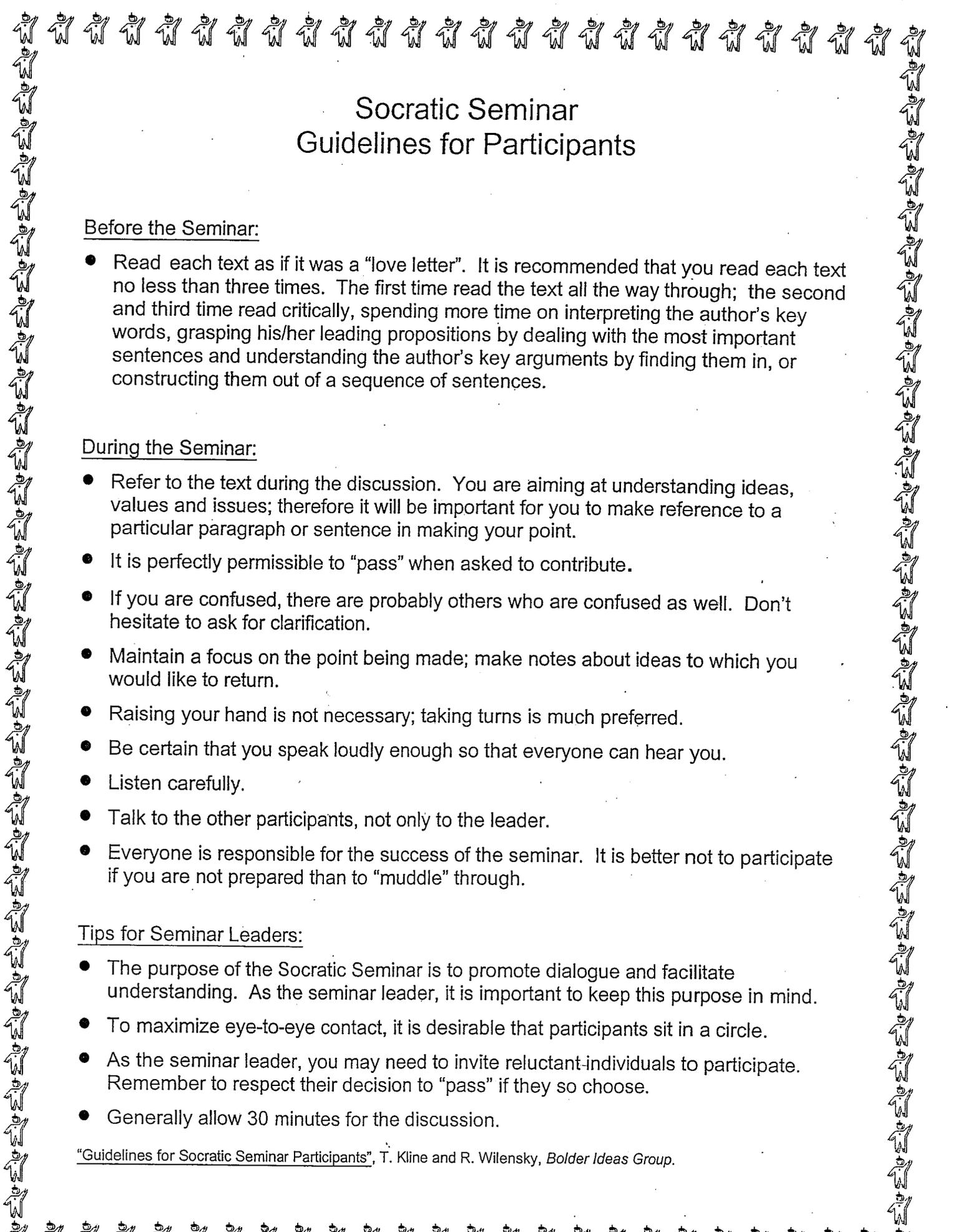
Procedures

INTRODUCTION TO THE STUDENTS

When reciprocal teaching is first introduced to the students, it is with some discussion regarding the many reasons why text may be difficult to understand, why it is important to have a strategic approach to reading and studying, and how the reciprocal teaching procedure will help the students understand and monitor their understanding as they read.

The students are then given an overall description of the procedure, emphasizing that it takes the form of a dialogue or discussion about the text and that everyone takes a turn assuming the role of teacher in this discussion. The students are introduced to the four strategies with the explanation that they will use these strategies to help them lead the discussion. To illustrate, the person who is assuming the role of teacher will first ask a question that he or she thinks covers important information that has been read. The other members of the group answer that question and suggest others they may have thought of. The "teacher" then summarizes the information read, points out anything that may have been unclear, leads the group in clarifying, and, finally, predicts the upcoming content.

To ensure a minimal level of competency with the four strategies, the students receive practice with each of the strategies. For example, the students summarize their favorite movie or television show. They then identify main idea information in brief and simple sentences and graduate to more complex paragraphs that contain redundant and trivial information. Each strategy receives one day of introduction.



Socratic Seminar Guidelines for Participants

Before the Seminar:

- Read each text as if it was a "love letter". It is recommended that you read each text no less than three times. The first time read the text all the way through; the second and third time read critically, spending more time on interpreting the author's key words, grasping his/her leading propositions by dealing with the most important sentences and understanding the author's key arguments by finding them in, or constructing them out of a sequence of sentences.

During the Seminar:

- Refer to the text during the discussion. You are aiming at understanding ideas, values and issues; therefore it will be important for you to make reference to a particular paragraph or sentence in making your point.
- It is perfectly permissible to "pass" when asked to contribute.
- If you are confused, there are probably others who are confused as well. Don't hesitate to ask for clarification.
- Maintain a focus on the point being made; make notes about ideas to which you would like to return.
- Raising your hand is not necessary; taking turns is much preferred.
- Be certain that you speak loudly enough so that everyone can hear you.
- Listen carefully.
- Talk to the other participants, not only to the leader.
- Everyone is responsible for the success of the seminar. It is better not to participate if you are not prepared than to "muddle" through.

Tips for Seminar Leaders:

- The purpose of the Socratic Seminar is to promote dialogue and facilitate understanding. As the seminar leader, it is important to keep this purpose in mind.
- To maximize eye-to-eye contact, it is desirable that participants sit in a circle.
- As the seminar leader, you may need to invite reluctant individuals to participate. Remember to respect their decision to "pass" if they so choose.
- Generally allow 30 minutes for the discussion.

"Guidelines for Socratic Seminar Participants", T. Kline and R. Wilensky, *Bolder Ideas Group*.

II. Socratic Questioning: Wondering Aloud About Meaning and Truth

Introduction

Socratic discussion, wherein students' thought is elicited and probed, allows students to develop and evaluate their thinking by making it explicit. By encouraging students to slow their thinking down and elaborate on it, Socratic discussion gives students the opportunity to develop and test their ideas — the beliefs they have spontaneously formed and those they learn in school. Thus, students can synthesize their beliefs into a more coherent and better-developed perspective.

Socratic questioning requires teachers to take seriously and wonder about what students say and think: what they mean, its significance to them, its relationship to other beliefs, how it can be tested, to what extent and in what way it is true or makes sense. Teachers who wonder about the meaning and truth of students' statements can translate that curiosity into probing questions. By wondering aloud, teachers simultaneously convey interest in and respect for student thought, and model analytical moves for students. Fruitful Socratic discussion infects students with the same curiosity about the meaning of and truth of what they think, hear, and read and gives students the clear message that they are expected to think and to take everyone else's beliefs seriously.

Socratic questioning is based on the idea that all thinking has a logic or structure, that any one statement only partially reveals the thinking underlying it, expressing no more than a tiny piece of the system of interconnected beliefs of which it is a part. Its purpose is to expose the logic of someone's thought. Use of Socratic questioning presupposes the following points: All thinking has a structure; is or can be tested; has consequences and consequences are not others; is relatively clear or unclear; is relatively deep or superficial; is relatively critical or uncritical; is relatively elaborated or undeveloped; is relatively monological or multi-logical. Critical thinking is thinking done with an effective, self-monitoring awareness of these points.

Socratic instruction can take many forms. Socratic questions can come from the teacher or from students. They can be used in a large group discussion, in small groups, one-to-one, or even with oneself. They can have different purposes. What each form has in common is that someone's thought is developed as a result of the probing, stimulating questions asked. It requires questioners to try on others' beliefs, to imagine what it would be to accept them and wonder what it would be to believe otherwise. If a student says that people are selfish, the teacher may wonder aloud as to what it means to say that, how the student explains acts others call altruistic, what sort of example that student would accept as an unselfish act, or what the student thinks it means to say that an act or person was unselfish. The discussion which follows should help clarify the concepts of selfish and unselfish behavior, as well as the kind of evidence required to determine whether or not someone is or is not acting selfishly, and the consequences of accepting or rejecting the original generalization. Such a discussion enables students to examine their own views on such concepts as generosity, motivation, obligation, human nature, right, and wrong.

Some people erroneously believe that holding a Socratic discussion is like conducting a chaotic free-for-all. In fact, Socratic discussion has distinctive goals and distinctive ways to achieve them. Indeed, any discussion — any thinking — guided by Socratic questioning is structured. The discussion, the thinking, is structured to take student thought from the unclear to the clear, from the unreasoned to the reasoned, from the implicit to the explicit, from the unexamined to the examined, from the inconsistent to the consistent, from the unarticulated to the articulated. To learn how to participate in it, one has to learn how to listen carefully to what others say, to look for reasons and evidence, to recognize and reflect upon assumptions, to discover implications and consequences, to seek examples, analogies, and objections, to seek to discover, in short, what is really known and to distinguish it from what is merely believed.

Socratic Questioning

- raises basic issues
- probes beneath the surface of things
- pursues problematic areas of thought
- helps students to discover the *structure* of their own thought
- helps students develop sensitivity to clarity, accuracy, and relevance
- helps students arrive at judgment through their own reasoning
- helps students note claims, evidence, conclusions, questions-at-issue, assumptions, implications, consequences, concepts, interpretations, points of view: the elements of thought

Three Kinds of Socratic Discussion

We can loosely categorize three general forms of Socratic questioning and distinguish three basic kinds of preparation for each: the spontaneous, the exploratory, and the issue-specific.

Spontaneous or unplanned

Every teacher's teaching should be imbued with the Socratic spirit. We should always keep our curiosity and wondering alive. If we do, there will be many occasions in which we will spontaneously ask students questions about what they mean and explore with them how we might find out if something is true. If one student says that a given angle will be the same as another angle in a geometrical figure, we may spontaneously wonder how we might go about proving or disproving that. If one student says Americans love freedom, we may spontaneously wonder about exactly what that means (Does that mean, for example, that we love freedom more than other people do? How could we find out?). If in a science class a student says that most space is empty, we may be spontaneously moved to raise some question on the spot as to what that might mean and how we might find out.

Such spontaneous discussions provide models of listening critically as well as exploring the beliefs expressed. If something said seems questionable, misleading, or false, Socratic questioning provides a way of helping students to become self-correcting, rather than relying on correction by the teacher. Spontaneous Socratic discussion can prove especially useful when students become interested in a topic, when they raise an important issue, when they are on the brink of grasping or integrating something, when discussion becomes bogged down or confused or hostile.

Socratic questioning provides specific moves which can fruitfully take advantage of the interest, effectively approach the issue, aid integration and expansion of the insight, move a troubled discussion forward, clarify or sort through what appears confusing, and diffuse frustration or anger.

Although by definition there can be no pre-planning for a particular spontaneous discussion, teachers can prepare themselves by becoming familiar and comfortable with generic Socratic questions, and developing the art of raising probing follow-up questions and giving encouraging and helpful responses. Ask for examples, evidence, or reasons, propose counter-examples, ask the rest of class if they agree with a point made, suggest parallel or analogous cases, ask for a paraphrase of opposing views, rephrase student responses clearly and succinctly. These are among the most common moves.

- If you see little or no relevance in a student comment, you may think, "I wonder why this student mentioned that now?" and ask, "What connection do you see between our discussion and your point that ...?" or "I'm not sure why you mentioned that now. Could you explain how it's related to this discussion?" or "What made you think of that?" Either the point is germane so you can clarify the connection, or only marginally related, so you can rephrase it and say "A new issue has been raised." That new issue can be pursued then, or tactfully postponed, or can generate an assignment.
- If a student says something vague or general, you may think, "I wonder about the role of that belief in this student's life, the consequences of that belief, or how the student perceives the consequences, or if there are any practical consequences at all" and so may ask, "How does that belief affect how you act? What, for example, do you do or refrain from doing because you believe that?" You might have several students respond and compare their understandings, or suggest an alternative view and have students compare its consequences.

To summarize: Because we begin to wonder more and more about meaning and truth, and so think aloud in front of our students by means of questions, Socratic exchanges will occur at many unplanned moments in our instruction. However, in addition to these unplanned wonderings we can also design or plan out at least two distinct kinds of Socratic discussion: one that explores a wide range of issues and one that focuses on one particular issue.

Exploratory

What we here call *exploratory* Socratic questioning enables teachers to find out what students know or think and to use it to probe into student thinking on a variety of issues. Hence you may use it to learn students' impressions of a subject in order to assess their thought and ability to articulate it, you may use it to see what students value, or to uncover problematic areas or potential biases, or find out where students are clearest and fuzziest in their thinking. You may use it to discover areas or issues of interest or controversy, or to find out where and how students have integrated school material into their belief systems. Such discussions can serve as preparation in a general way for later study or analysis of a topic, as an introduction, as review, to see what students understood from their study of a unit or topic preparatory to taking a test, to suggest where they should focus study for test, as a basis for or guide to future assignments, or to prepare for an assignment. Or, again, you might have students take (or pick) an issue raised in discussion and give their own views, or have students form groups to discuss the issue or topic.

This type of Socratic questioning raises and explores a broad range of interrelated issues and concepts. It requires minimal pre-planning or pre-thinking. It has a relatively loose order or structure. You can prepare by having some general questions ready to raise when appropriate by

considering the topic or issue, related issues and key concepts. You can also prepare by predicting students' likeliest responses and preparing some follow-up questions. Remember, however, that once students' thought is stimulated there is no predicting exactly where discussion will go.

What follows are some suggestions and possible topics for Socratic discussions:

• "What is social studies?" If students have difficulty, ask, "When you've studied social studies, what have you studied/talked about?" If students list topics, put them on the board. Then have students discuss the items and try to group them. "Do these topics have something in common? Are there differences between these topics?" Encourage students to discuss details they know about the topics. If, instead of listing topics, they give a general answer or definition, or if they are able to give a statement about what the topics listed have in common, suggest examples that fit the definition but are not social studies. For example, if a student says, "It's about people," mention medicine. Have them modify or improve their definition. "How is social studies like and unlike other subjects? What basic questions does the subject address? How does it address them? Why study social studies? Is it important? Why or why not? How can we use what we learn in social studies? What are the most important ideas you've learned from this subject?"

- When, if ever, is violence justified? Why are people as violent as they are? What effects does violence have? Can violence be lessened or stopped?
- What is a friend?
- What is education? Why learn?
- What is most important?
- What is right and wrong? Why be good? What is a good person?
- What is the difference between living and non-living things?
- Of what sorts of things is the universe made?
- What is language?
- What are the similarities and differences between humans and animals?

There may be occasions when you are unsure whether to call a discussion exploratory or issue-specific. Which you call it is not important. What is important is what happens in the discussion. For example, consider this group of questions:

- What does 'vote' mean?
 - How do people decide whom to elect? How should they decide? How could people predict how a potential leader is likely to act? If you don't know about an issue or the candidates for an office, should you vote?
 - Is voting important? Why or why not? What are elections supposed to produce? How? What does that require? What does that tell us about voting?
 - Why are elections considered a good idea? Why is democracy considered good? What does belief in democracy assume about human nature?
 - How do people become candidates?
 - Why does the press emphasize how much money candidates have? How does having lots of money help candidates win?
 - Why do people give money to candidates? Why do companies?

These questions could be the list generated as possible questions for an exploratory discussion. Which of them are actually used would depend on how students respond. For an issue-specific discussion, these questions and more could be used in an order which takes students from ideas with which they are most familiar to those with which they are least familiar.

Issue-Specific

Much of the time you will approach your instruction with specific areas and issues to cover. This is the time for issue-specific Socratic questioning. To really probe an issue or concept in depth, to have students clarify, sort, analyze and evaluate thoughts and perspectives, distinguish the known from the unknown, synthesize relevant factors and knowledge, students can engage in an extended and focused discussion. This type of discussion offers students the chance to pursue perspectives to their most basic assumptions and through their furthest implications and consequences. These discussions give students experience in engaging in an extended, ordered, and integrated discussion in which they discover, develop, and share ideas and insights. It requires pre-planning or thinking through possible perspectives on the issue, grounds for conclusions, problematic concepts, implications, and consequences. You can further prepare by reflecting on those subjects relevant to the issue: their methods, standards, basic distinctions and concepts, and interrelationships — points of overlap or possible conflict. It is also helpful to be prepared by considering likeliest student answers. This is the type of Socratic questioning most often used in the lesson remodels themselves. Though we can't provide the crucial follow-up questions, we illustrate pre-planning for issue-specific Socratic questioning in numerous remodels.

All three types of Socratic discussion require development of the art of questioning. They require the teacher to develop familiarity with a wide variety of intellectual moves and sensitivity to when to ask which kinds of questions, though there is rarely one best question at any particular time.

Some Suggestions for Using Socratic Discussion

- Have an initial exploratory discussion about a complex issue in which students break it down into simpler parts. Students can then choose the aspects they want to explore or research. Then have an issue-specific discussion where students share, analyze, evaluate, and synthesize their work.
- The class could have a "fishbowl" discussion. One third of the class, sitting in a circle, discusses a topic. The rest of the class, in a circle around the others, listens, takes notes, then discusses the discussion.
- Assign an essay asking students to respond to a point of interest made in a discussion.
- Have students write summaries of their discussions immediately afterwards. They could also add new thoughts or examples, provide further clarification, etc. They could later share these notes.

A Taxonomy of Socratic Questions

It is helpful to recognize, in light of the universal features in the logic of human thought, that there are identifiable categories of questions for the adept Socratic questioner to dip into: questions of clarification, questions that probe assumptions, questions that probe reasons and evidence, questions about viewpoints or perspectives, questions that probe implications and consequences, and questions about the question. Here are some examples of generic questions in each of these categories:

Questions of Clarification

- What do you mean by _____?
- What is your main point?
- How does _____ relate to _____?
- Could you put that another way?
- What do you think is the main issue here?
- Is your basic point _____ or _____?
- Let me see if I understand you: do you mean _____ or _____?
- How does this relate to our discussion/ problem/ issue?
- What do you think John meant by his remark? What did you take John to mean?
- Jane, would you summarize in your own words what Richard has said? ... Richard, is that what you meant?
- Could you give me an example?
- Would this be an example: _____?
- Could you explain that further?
- Would you say more about that?
- Why do you say that?

Questions that Probe Assumptions

- What are you assuming?
- What is Karen assuming?
- What could we assume instead?
- You seem to be assuming _____. Do I understand you correctly?
- All of your reasoning is dependent on the idea that _____. Why have you based your reasoning on _____ rather than _____?
- You seem to be assuming _____. How would you justify taking this for granted?
- Is it always the case? Why do you think the assumption holds here?

Questions that Probe Reasons and Evidence

- What would be an example?
- What are your reasons for saying that?
- What other information do we need to know?
- Could you explain your reasons to us?
- But is that good evidence to believe that?
- Are those reasons adequate?
- Is there reason to doubt that evidence?
- Who is in a position to know if that is the case?
- What would you say to someone who said _____?
- Can someone else give evidence to support that response?
- By what reasoning did you come to that conclusion?
- How could we go about finding out whether that is true?
- How do you know?
- Why did you say that?
- Why do you think that is true?
- What led you to that belief?
- Do you have any evidence for that?
- How does that apply to this case?
- What difference does that make?
- What would convince you otherwise?

Questions About Viewpoints or Perspectives

- You seem to be approaching this issue from _____ perspective. Why have you chosen this rather than that perspective?
- How would other groups/types of people respond? Why? What would influence them?
- How could you answer the objection that _____ would make?
- Can/did anyone see this another way?
- What would someone who disagrees say?
- What is an alternative?
- How are Ken's and Roxanne's ideas alike? Different?

Questions that Probe Implications and Consequences

- What are you implying by that?
- When you say _____, are you implying _____?
- But if that happened, what else would also happen as a result? Why?
- What effect would that have?

- Would that necessarily happen or only probably happen?
- What is an alternative?
- If this and this are the case, then what else must also be true?

Questions About the Question

- How can we find out?
- How could someone settle this question?
- Is the question clear? Do we understand it?
- Is this question easy or hard to answer? Why?
- Would ____ put the question differently?
- Does this question ask us to evaluate something?
- Do we all agree that this is the question?
- To answer this question, what questions would we have to answer first?
- I'm not sure I understand how you are interpreting the main question at issue.
- Is this the same issue as ____?
- Can we break this question down at all?
- How would ____ put the issue?
- What does this question assume?
- Why is this question important?

Wondering (And Wondering About Your Wonderings)

As a blossoming critical thinker, you will find yourself wondering in many directions. You will often, however, be unsure about how many of these wonderings to share with your students. You certainly don't want to overwhelm them. Neither do you want to confuse them or lead them in too many directions at once. So when do you make the wonderings explicit in the form of a question and when do you keep them in the privacy of your mind?

There is no pat formula or procedure for answering these questions, though there are some principles:

- "Test and find out." There is nothing wrong with some of your questions misfiring. You won't always be able to predict what questions will stimulate students' thought. So you must engage in some trial-and-error questioning.
- "Tie into student experience and perceived needs." You may think of numerous examples of ways students can apply what they learn, and formulate questions relating academic material to students' lives.
- "Don't give up too soon." If students don't respond to a question, wait. If they still don't respond, you could rephrase the question or break it down into simpler questions.

The teacher must use care and caution in introducing students to Socratic questioning. The level of the questions should match the level of the students' thought. It should not be assumed that students will be fully successful with it, except over a considerable length of time. Nevertheless, properly used, it can be introduced in some form or other at virtually any grade level.

Socratic Interludes in Class

#1 Helping Students Organize Their Thoughts for Writing

Introduction

The following Socratic interlude represents an initial attempt to get students to think about what a persuasive essay is and how to go about preparing to write one. Of course, like all Socratic questioning it goes beyond one objective, for it also stimulates students to think critically in general about what they are doing and why. It helps them to see that their own ideas, if developed, are important and can lead to insights.

Transcript

(A Reconstruction)

T: you are all going to be writing a persuasive essay, so let's talk about what you have to do to get your ideas organized. There are two ways to persuade people of something, by appealing to their reason, a rational appeal, and by appealing to their emotions, an emotional appeal. What is the difference between these? Let's take the rational appeal first, what do you do when you appeal to someone's reason?

John: You give them good reasons for accepting something. You tell them why they should do something or what they can get out of it or why it's good for them.

T: But don't they already have reasons why they believe as they do? So why should they accept your reasons rather than theirs?

Bob: Well, maybe mine are better than theirs.

T: But haven't you ever given someone, say your mother or father, good reasons for what you wanted to do, but they just did not accept your reasons even though they seemed compelling to you.

Susan: Yeah, that happens a lot to me. They just say that I have to do what they say whether I like it or not because they are my parents.

T: So is it hopeless to give people good reasons for changing their minds because people will never change their minds?

Grace: No, people sometimes do change their minds. Sometimes they haven't thought about things a lot or they haven't noticed something about what they're doing. So you tell them something they hadn't considered and then they change their minds....sometimes.

T: That's right, sometimes people do change their minds after you give them a new way of looking at things or reasons they hadn't considered. What does that tell you about one thing you want to be sure to do in deciding how to defend your ideas and get people to consider them? What do you think, Tom?

Tom: I guess you want to consider different ways to look at things, to find new reasons and things.

T: Well, but where can you find different ways to look at things? What do you think, Janet?

Janet: I would look in the library.

T: But what would you look for, could you be more specific?

Janet: Sure, I'm going to write about why women should have the same rights as men, so I'll look for books on feminism and women.

T: How will that help you to find different ways to look at things, could you spell that out further?

Janet: I think that certainly there will probably be different ideas in different books. Not all women think alike. Black women and white women and religious women and Hispanic women all have their own point of view. I will look for the best reasons that each give and try to put them into my paper.

T: OK, but so far we have just talked about giving reasons to support your ideas, what I called in the beginning a rational appeal. What about the emotional side of things, of appealing to people's emotions? John, what are some emotions and why appeal to them?

John: Emotions are things like fear and anger and jealousy, what happens when we feel strongly or are excited.

T: Right, so do you know anyone who appeals to our emotions? Are your emotions ever appealed to?

Judy: Sure, we all try to get people involved in feeling as we do. When we talk to friends about kids we don't like we describe them so that our friends will get mad at them and feel like we do.

T: How do we do this, could you give me an example, Judy?

Judy: OK, like I know this girl who's always trying to get her hands on boys, even if they already have girl friends. So I tell my friends how she acts. I give them all the details, how she touches them when she talks to them and acts like a dip. We really get mad at her.

T: So what do you think, should you try to get your reader to share your feeling? Should you try to get their emotions involved?

Judy: Sure, if you can.

T: But isn't this the way propoganda works? How we get people emotional so that they go along with things they shouldn't? Didn't Hitler get people all emotional and stir up their hate?

Judy: Yeah, but we do that too when we play the national anthem or when we get excited about Americans winning medals at the Olympics.

T: So what do you think of this Frank, should we or shouldn't we try to get people's emotions stirred up?

Frank: If what we are try to get people to do is good we should do it, but if what we are trying to get them to do is bad we shouldn't.

T: Well, what do you think about Judy's getting her friends mad at a girl by telling them how she flirts with boys?

Frank: Are you asking me?....I think she ought to clean up her own act first. (laughter)

Judy: What do you mean by that?!

Frank: Well, you're one of the biggest flirts around!

Judy: I never flirt with boys who have girl friends and anyway I'm just a friendly person.

Frank: Yes you are, very friendly!

T: OK, calm down you guys, I think you better settle this one in private. But look, there's an important point here. Sometimes we do act inconsistently, sometimes there are contradictions in our behavior, and we criticize people for doing what we do. And that's one thing we should think about when writing our papers, are we willing to live by what we are preaching to others? Or another way to put this is by asking whether our point of view is realistic. If our point of view seems too idealistic then our reader may not be persuaded.

We don't have much time left today, so let me try to summarize what I see as implied in what we have talked about. So far, we have agreed about a number of things important to persuasive writing: 1) you need to give good reasons to support your point of view, 2) you should be clear about what your reasons are, 3) you should consider the issue from more than one point of view, including considering how your reader might look at it, 4) you should check out books or articles on the subject to get different points of view, 5) you should consider how you might reach your reader's feelings, how what you say ties into what they care about, 6) following Judy's example you should present specific examples and include the details that make your example realistic and moving, 7) in line with Frank's point, you should watch out for contradictions and inconsistencies, and 8) you should make sure that what you are arguing for is realistic. For next time I would like you all to write out the introductory paragraph to your paper in

which you basically tell the reader what you are going to try to persuade him or her of and how you are going to do it, that is, how the paper will be structured. Don't worry that your first draft is rough: you will be working in groups of threes to sharpen up what you have written.

#2: Helping Students to Think More Deeply about Basic Ideas

Introduction

We tend to pass by basic ideas quickly in order to get into more derivative ideas. This is part of the didactic mind set of school-is-giving-students-content-to-remember. What we need to do, in contrast, is to stimulate student's thinking right from the beginning, especially about the most basic ideas in a subject so that they are motivated from the beginning to use their thinking in trying to understand things, and so that they base their thinking on foundational ideas that make sense to them.

Transcript

(A Reconstruction)

Teacher: This is a course in Biology. What kind of a subject is that? What do you know about Biology already? Kathleen, what do you know about it?

Kathleen: It's a science.

T: And what's a science?

Kathleen: Me? A science is very exact. They do experiments and measure things and test things.

T: Right, and what other sciences are there besides Biology? Marisa, could you name some?

Marisa: Sure, there's Chemistry and Physics.

T: What else?

Blake: There's Botany and Math?

T: Math...math is a little different from the others, isn't it? How is math different from Biology, Chemistry, Physics, and Botany? Blake, what would you say?

Blake: You don't do experiments in math.

T: And why not?

Blake: I guess cause numbers are different.

T: Yes, studying numbers and other mathematical things is different from studying chemicals or laws in the physical world or living things and so forth. You might ask your math teacher about why numbers are different or do some reading about that, but let's focus our attention here on what are called the life sciences. Why are Biology and Botany called life sciences?

Peter: Because they both study living things.

T: How are they different? How is Biology different from Botany? Jennifer, what do you think?

Jennifer: I don't know.

T: Well, let's all of us look up the words in our dictionaries and see what is said about them.

(Students look up the words)

T: Jennifer, what did you find for Biology?

Jennifer: It says: "The science that deals with the origin, history, physical characteristics, life processes, habits, etc...of plants and animals: It includes Botany and Zoology".

T: So what do we know about the relationship of Botany to Biology? Rick?

Rick: Botany is just a part of Biology.

T: Right, and what can we tell about Biology from just looking at its etymology. What does it literally mean? If you break the word into two parts "bio" and "logy". Blake, what does it tell us?

Blake: The science of life or the study of life.

T: So, do you see how etymology can help us get an insight into the meaning of a word? Do you see how the longer definition spells out the etymological meaning in greater detail? Well, why do you think experiments are so important to biologists and other scientists? Have humans always done experiments do you think? Marisa.

Marisa: I guess not, not before there was any science.

T: Right, that's an excellent point, science didn't always exist. What did people do before science existed? How did they get their information? How did they form their beliefs? Peter.

Peter: From religion.

T: Yes, religion often shaped a lot of what people thought. Why don't we use religion today to decide, for example, what is true of the origin, history, and physical characteristics of life?

Peter: Some people still do. Some people believe that the Bible explains the origin of life and that the theory of evolution is wrong.

T: What is the theory of evolution, Jose?

Jose: I don't know.

T: Well, why don't we all look up the name Darwin in our dictionaries and see if there is anything there about Darwinian theory.

(Students look up the words)

T: Jose, read aloud what you have found.

Jose: It says "Darwin's theory of evolution holds that all species of plants and animals developed from earlier forms by hereditary transmission of slight variations in successive generations and that the forms which survive are those that are best adapted to the environment."

T: What does that mean to you...in ordinary language? How would you explain that? Jose.

Jose: It means the stronger survive and the weaker die?

T: Well, if that's true why do you think the dinosaurs died out? I thought dinosaurs were very strong?

Shannon: They died because of the ice age, I think.

T: So I guess it's not enough to be strong, you must also fit in with the changes in the environment. Perhaps fitness or adaptability is more important than strength. Well, in any case why do you think that most people today look to science to provide answers to questions about the origin and nature of life rather than to the Bible or other religious teachings?

Shannon: Nowadays most people believe that science and religion deal with different things and that scientific questions cannot be answered by religion.

T: And by the same token, I suppose, we recognize that religious questions cannot be answered by science. In any case, how were scientists able to convince people to consider their way of finding answers to questions about the nature of life and life processes. Kathleen, you've been quiet for a while, what do you think?

Kathleen: To me science can be proved. When scientists say something we can ask for proof and they can show us, and if we want we can try it out for ourselves.

T: Could you explain that further?

Kathleen: Sure, in my chemistry class we did experiments in which we tested out some of the things that were said in our chemistry books. We could see for ourselves.

T: That's right, science is based on the notion that when we claim things to be true about the world we should be able to test them to see if, objectively, they are true. Marisa, you have a question?

Marisa: Yes, but don't we all test things. We test our parents and our friends. We try out ideas to see if they work.

T: That's true. But is there any difference between the way you and I test our friends and the way a chemist might test a solution to see if it is acidic?

Marisa: Sure, ... but I'm not sure how to explain it.

T: Blake, what do you think?

Blake: Scientists have laboratories; we don't.

T: They also do precise measurements and use precise instruments, don't they? Why don't we do that with our friends, parents, and children? Adrian, do you have an idea why not?

Adrian: We don't need to measure our friends. We need to find out whether they really care about us.

T: Yes, finding out about caring is a different matter than finding out about acids and bases, or even than finding out about animal behavior. You might say that there are two different kinds of realities in the world, the qualitative and the quantitative, and that science is mostly concerned with the quantitative, while we are often concerned with the qualitative. Could you name some qualitative ideas that all of us are concerned with? Rick, what do you think?

Rick: I don't know what you mean.

T: Well, the word qualitative is connected to the word quality. If I were to ask you to describe your own qualities in comparison to your brother or sister, would you know the sort of thing I was asking you?

Rick: I guess so.

T: Could you, for example, take your father and describe to us some of his best and some of his worst qualities as you see them?

Rick: I guess so.

T: OK, why don't you do it. What do you think some of your father's best qualities are?

Rick: To me he is generous. He likes to help people out when they are in trouble.

T: And what science studies generosity?

Rick: I don't know. None, I guess.

T: That's right, generosity is a human quality, it can't be measured scientifically. There is no such thing as generosity units. So science is not the only way we can find things out. We can also experience qualities in the world. We can experience kindness, generosity, fear, love, hate, jealousy, self-satisfaction, friendship, and many, many other things as well. In this class we are concerned mainly with what we can find out about life quantitatively or scientifically. For next time, I want you to read the first chapter in your text book and I want you to be prepared to explain what the first chapter says. I will be dividing you up into groups of four and each group of four will develop a short summary of the first chapter (without looking at it, of course) and then we will have a spokesperson from each group explain your summary to the class. After that, we will have a discussion of the ideas mentioned. Don't forget today's discussion, because I'll be asking you some questions that will see if you can relate what we talked about today with what was said in your first chapter. Any questions? ... OK. ... See you next time.

#3: Helping Students to Think Seriously about Complex Social Issues

Introduction

In the following extended discussion, Rodger Halstead, Homestead High School Social Studies teacher, Socratically questions students about their views about the Middle East. He links up the issue with the holocaust during WWII and, ultimately, with the problem of how to correct one injustice without committing another.

Part One

I thought what we'd do now is to talk a little about the Middle East. And remember we saw a film, and title of the film was, "Let My People Go." And in the process of seeing that film, we took a look at some of the things that happened in the concentration camps; in the death-camps of Nazi Germany during World War II. Remember that? It's pretty hard to forget, so I'm sure that you do remember that. Who do you hold responsible for what happened to the Jewish people during the holocaust, the Nazi holocaust of the 1940's and the late 1930's? Who do you hold responsible for that? Laura?

Laura: Everyone. Um ...

What do you mean, everyone?

Students: It started in Germany. I would ... My first thought goes to Hitler; then it goes to the German people that allowed him to take control without ... without seeing what he was doing before it was too late.

Let's see if we understand. Are you talking now about what I call moral responsibility, that they hold some moral responsibility for what happened, or are you talking about legal responsibility? What I'd like to really have us talk about is legal responsibility. Who would you punish for the responsibility for what happened to the Jewish people? Would you punish all Germans? No. OK, then who would you punish?

Student: Hitler.

Hitler. OK, if he had been alive and we'd been able to capture him, you would have punished him,
Student: Absolutely.

OK, I think probably we'd all agree to that, alright? Anybody else?

Student: Probably his five top men. I ... I'm not sure ...

Well, whatever. Whether it's five or six or ten or whatever. The top guys, the SS ...

Student: (several talking) Well, that's a good question ... and, there are a lot of Nazis out there.

Well, are you sure everyone was a member of the Nazi party? Not all Germans were.

Student: Well, not all Germans were ... um ...

Want to think about it?

Student: Yeah.

How about somebody else? First of all, we all agree that somebody should have been punished, right? Alright, these are not acts that should have gone unpunished. OK, Steve?

Steve: Well, it'd be kind of hard, but, like, I think that every soldier or whatever, whoever took a life, theirs should be taken. (Several speaking)

Every person who ... every ... every Nazi soldier who was in the camps ...

Steve: Who had something to do with ...

Who had something to do with the killing of the people in the camps. The Jews, the gypsies, the opponents of Hitler, all those people. All the 12 million killed. Anybody that had a direct ... played a direct role. You would punish them. What if we had a corporal here, Steve, and the corporal said, "The reason I did this is because I was ordered to do it. And if I didn't do it, my family was going to be injured, or something was going to happen to my family." Are you going to punish that corporal?

Steve: Well, I guess ... well, I mean ... ah, they ... They still took a life, you know, but they're ... what they're ... You know, they were just following the rules. What ... (Laughter) Yes, but I mean ... I, I, I believe that, you know, if you take a life ...

What if they didn't take a life? What if they just tortured somebody?

Steve: Then they ... then ... then they should be tortured in the same way.

So you say anybody who was directly responsible for any injury, torture, murder, whatever in the camps; they themselves should get a similar kind of punishment. What about the people who were in the beaurocracy of the German government who, ah, set up the trains and the time schedule of the trains? What about the engineer on the train? You're looking at me, Amy. I'm not sure if ...

Amy: Well, yeah, I guess ...

All those people?

Amy: Yeah, because if you think about it, if they hadn't of done that, they couldn't have gotten the people there.

OK, and what about the people standing on the streets while the Jews to get in the trucks ...

Amy: No, I think that's going a little too ...

OK, so anybody who participates in any way in the arrest, the carrying out of all these activities, including even people who, ah ... what about people who typed up the memos?

Amy: Yeah, I guess)

(Several Speaking)

No, says Manual. Why not no? Why no?

Manual: Like, for example, if they're put under a lot of duress. Like, ah, we're going to kill your family, we're going to hurt your family, put them in a concentration camp, too ...

Yes. Yes?

Manual: It, it's just total ... you just can't hold them responsible because their family ... it's just like, ah ... the next, the closest thing to them, and you can't just say you have to punish them because I don't think they did it on purpose. They didn't do it because we hate the Jews, we don't like you ... we're not doing it because we want to see you suffer. They're doing it because they don't want to see their family suffer.

Anybody who enjoyed what they were doing, Manny, clearly needs to be punished, in your? right? What if I do it, but I don't enjoy it? Oh, God! I don't want to do this! Ohhh! But you made me do it.

Manual: I don't think they should be punished.

OK, the war's over, Manny. Let's get the man in here for a second. The war's over, Manny, and we now have the rest of these people. Leslie, did you do that because you wanted to do that? (jumps to Rodger)

(Laughter)

Student: No.

No. Gail, did you do it because you wanted to do it?

Gail: No.

Did you do it because you wanted to do it, Ariel? Did you do it, Laurel? Cuz you wanted, Brad?

Student: No.

Manny, what we got? None of them did it because they wanted to. They all did it because it was orders.

Manual: Well, ah ...

How do we know?

Manual: That's a good question.

You want to get off the hot seat for a second, Manny?

Manual: Yeah.

OK, I don't know ... eeny, meeny, Stacy?

Stacy: Well, ah ... that's why I think that it should maybe just be the leadership because they're the ones ...

Just Hitler, and the ...

Stacy: Yeah, cuz they're the ones who made up the concentration camps, and they're the ones who tell the people to do it. And some people will want to do these things, and some people won't, and you can't determine who wants to do it and who doesn't.

Student: Yeah, but how far do you go down?

Stacy: See ... Well, that's why you just do ... it'd just be those top ...

Student: What's the top ...

Stacy: Hitler and his five or six men.

Stacy, would I gather that you agree with Manny that if somebody really enjoyed doing it and wanted to do it, 'doing it' meaning hurting, killing, torture; if they really wanted to do it and enjoyed it, those people should be punished.

Stacy: Yeah, they should, but you can't decide, you can't tell who really wanted to be ...

OK, someone who did it reluctantly, you shouldn't punish them, is that right?

Stacy: Right.

Suppose you and I are in the mafia. And suppose you and I are in the mafia, and I order you to kill ... ah, Katherine. OK?

Stacy: OK.

You happen to be ... ah, acquaintances with Kathy, and you don't want to do it, but I order you to do it. And, in fact you do, you carry it out because I tell ya, if you don't do it, I'm going to pull your fingernails out, and your toenails, and I'm going to shoot off you kneecap. And so you kill Katherine. Now, along comes Brad. He's a policeman. And he arrests you for killing Katherine, OK? And you say, "I didn't want to do it. My toenails were going to go out, my fingernails were going to go out, my kneecaps were going to go." Should we say, "You're home free, Stacy."

Stacy: No, I'd lead them to you, is what I'd do.

So, they're going to arrest me.

Stacy: Yeah.

Alright. Now should you be arrested? Should we just say, "I'm sorry, Stacy, should you be arrested? Should you be punished?"

Stacy: Yeah, I should be arrested but maybe not. ... You should be really punished, yeah.

Really punished

Stacy: Yeah

Should you be punished too?

Stacy: I'm in the Mafia, I shouldn't be in the Mafia

So any body who is in the camp who does these deeds because even though they did it because they did not want to do them they should also be held responsible and punished.

Stacy: You can't. There are too many of them. It's stooping to the Nazi's level by killing, by punishing all these people

So will you let some of them go free because you can't punish all

Stacy: Right, you can't, you can't punish a whole entire group of people that's like millions of people

Why can't you do that?

Stacy: Because it's doing what they were doing to the Jewish people.

We'll we get some disagreement here, Jeannette

Jeannette: If you can't call a person responsible for making a decision, where does that leave society.

What kind of decision?

Jeannette: They made a decision to follow the order

And you are saying we can't be responsible for a major

(voices)

Oh I'm sorry. Oh you have to ... the front row is answering ... why must you hold them responsible?

(Laughter.)

Jeannette: Because they made the decision, they did it.

But what if they did it under duress?

Jeannette: They could've ... faced the responsibilities, you have to face responsibilities either way, you can't just do something.

Suppose, suppose I say to you. "Jeanette you, I want you to ah pull Bill's eyeballs out of his head. (Laughter) And if you don't do that, I am going to kill you, Jeanette."

Jeannette: I am responsible

Are you responsible?

Jeannette: I'm responsible.

You're going to die!

Jeannette: I'm responsible!

So we should punish you because you do this deed even though you would have died if you hadn't done it?

Jeannette: No! it's still my decision.

Student: Yeah.

Stacy: But they, what if they were drafted into being in the Nazi camps and they were forced to do that — and they did not want to do that?

Student: How did they force ...

Stacy: Just like we had American troops in Viet Nam, they were killing people.

Student: And they were drafted. A lot of people ran though ...

Student: A lot of people didn't.

Time out! time out, we have a real important discussion and that is the issue of the people who, what about the people who did not willingly do it who did it because of orders, are they or are they not responsible?

Student: No.

Jody

Jody: I agree with Janet. They are responsible, they made the decision to do it. — they have a choice but some people I'm sure made the choice to die rather than to do this. I'm sure there were people that did that. And that was their decision because they could not go through with the order. You can't live with that. They went through it and made that decision. They have to live with what they did and they have to be punished for it because they took the lives of other people.

Wait a minute, no, no, no, no, no. Do you know the story of Patty Hearst at all? I know its ancient history to you. When she was kidnapped by a group call the SLA. She was brain-washed and she was beaten. She was abused and eventually she joins the group and they rob a bank and she had a part of the bank robbery up in Carmichael, CA, it's up near Sacramento and in the process of doing that after she is freed she argued that during the bank robbery they had a gun on her and she didn't have any choice now she's arrested for the bank robbery and she's going to be put on trial. Is she responsible for her acts in that bank robbery Jody, because if she didn't participate in that, there was gun on her and she could have been killed. Does she go free or do you punish her for the bank robbery?

Jody: That's a hard question. (yeah, no fair) was it proven that there was a gun on her?

Yes they had tape. It was not clear whether there were bullets in the gun or so forth. There is tape of a gun.

Jody: Well, if there's really proof, that's different.

What do you mean that's different?

Jody: Well, than someone who was a Nazi

No, no, no, let's not get to Nazi yet. You're on a jury, Jody, are you going to vote guilty or innocent?

Jody: Innocent

Why?

Jody: Because there was proof that she was forced; it wasn't a threat that something was going to happen. She was forced.

Did she do it under threat of her own life?

Student: Yes

All right, Leslie here is a Nazi. OK, Gayle is just a neutral. Leslie tells Gayle if you don't kill Ariel the Jew, you will be punished. Gayle kills Ariel the Jew. The reason she does is because Leslie told her to do it.

Jody: No, I guess.

Leslie held the gun on her. Are we not going to punish Gayle — Gayle "Patty Hearst"

Jody: No. I would probably have to say that she would have to be responsible.

Patty Hearst Patty Hearst

Jody: Yeah.

Because you see the inconsistency with the previous position and you want to hold the position that in fact everyone who does things even under orders and compulsion are responsible for what they do. Is that right? Would I be clear that in any future argument with your parents, you will not argue a line that might say, "The reason I did that is because somebody else told me I had to do that." You'll never argue that?

Jody: Your parents always say, "But it was your decision."

And you agree to that.

Jody: And you don't have to listen to what everyone else says.

And you believe that.

Jody: Yeah.

And you will follow it.

Jennifer.

Jennifer: Um, I agree with Janet, but I think its conditional because

What is conditional?

Jennifer: Well, that, that the people are ultimately responsible for their actions because in the Patty Hearst case, she umm, it was a bank robbery, and that wasn't directly, I mean that was, — are not supposed to steal people's money and that would affect people but it's not physically, its not physical pain and it's not, you know, killing them, and so I think they should of um punish all the people who are in the Nazi camp because they were responsible for — physical pain and ah their deaths.

Now let's see. Let's change it just slightly to make sure we understand. So far, we have pretty wide — all the leaders get punished, right? We had some disagreement on who in the camps will be punished and some of you think all the people involved in the camps and others think not quite all the people. Anybody beyond that? What about Germans who knew what was going on and did nothing to stop it?

Student: (many voices)

It's too broad.

It's too broad?

Student: Yeah.

Is there anybody in the room right now who thinks that we should punish all the Germans who knew what was going on and did nothing to stop it. OK, so obviously you would not agree to punish Americans who knew about it, right? Or the British, right? So you're keeping your level of punishment to the leaders and those who are directly involved, and you have some disagreement on who is directly involved and should be punished. Have I got it right?

Part Two

You're in the U.N. It's 1947. You have now been given the legal right, whether you believe it is the moral right or not, you have been given the legal right to decide what to do with Palestine. OK, we are not talking about moral. No, we are talking about legal. You are a country, you are going to have to vote on what to do with the state of Palestine. What are you going to do?

Student: Vote for the Arabs

For the Arabs.. you are going to vote that the Arabs have — why?

Student: Additionally, I would give the Jews a piece of Germany.

OK. OK. Would you today be somewhat sympathetic to a Palestinian who comes to you and says, "My land has been taken wrongly from me and I have been driven off my land by a people and by an organization for an act that I had no responsibility for." Would you be sympathetic to a Palestinian who said that?

Jeanette: Yes

What would you say to the Palestinian, other than to say that I am sympathetic?

Jeanette: I would say what my Daddy always says to me, that life is not fair.

So the world is not fair and life is not fair. We do the best we can. Do the Palestinians have, in your mind, some right to oppose what was done to them?

Jeanette: Yes

Do they have the right to use force to try to, uh, change what was done to them?

Jeanette: They have a right.

In your mind?

Jeanette: yes, they do.

How do we get out of this dilemma?

Jeanette: I don't know.

It is a real dilemma isn't it?

Jeanette: Yea.

Anybody else? John.

John: No wait, I want to clarify a couple of things first.

OK

John: OK, the land that is, uh, that is in question, Palestine, was once the Jews'. If we go back far enough ... it was their holy land, right?

Yes. Correct.

John: And the Arabs drove them off a long time ago.

Well, actually the Romans drove them off.

John: The Romans drove them off, OK, but they've had a history of persecution, so isn't that ...

Student: The Jews?

John: Isn't that, yea the Jews, isn't that the significance of giving them that piece of land instead of a piece of Germany is because that's originally theirs and they have pride and heritage there and they were driven off ...

John, would you then argue the proposition that anybody who, any group of people, who have been persecuted and driven off their land, at some time in the future should be given that land back?

John: No.

That's not your proposition?

John: That's a Halstead generalization.

Well, I thought that's what you said; did I not get what you said correct?

John: I'm talking about the Jews specifically.

All right, explain it to me again, let's see if I hear it right.

John: OK, the Jews have been burned all through history.

All right.

John: You agree with that?

Yes, I do.

John: OK, and you agree that that was once their holy land.

I agree to that.

John: So, if in fact, the UN decides to give them a piece of land which they did, the significance of giving them that land in contrast to giving them a piece of Germany is because it was once theirs and it was, it had some significant to them, in fact we're trying to compensate for 'em, not just push them into the corner. OK.

I agree to all that, now are you saying to me that you personally, if you had been a delegate in the UN would have voted to give a portion of Palestine to the Jewish people because of that argument?

John: Correct.

Is that an argument that is valid for any other group of people or is that argument only valid to the Jewish people?

John: It's, yea, it depends.

Well, I ... suppose ... suppose I can find, John, suppose I can find another group of people who have been persecuted for a good portion of their life and had their land taken away by another group and now these people are trying to find someplace to live where they in fact can live a fruitful life, would you in fact agree to those people getting their land back?

John: Yea.

All right, let's talk about the American Indian. Were the American Indians persecuted?

Class: Yes.

Were they driven off their land?

Class: Yes.

Were they put in reservations?

Class: Yes.

Have we taken their land away from them?

Class: Yes.

John: And I'm not saying that's right.

Are the, are the American Indians today that are alive basically on land areas where they are not able to survive fruitfully as a people? Should they be given their land back?

Student: Some

John: Seems logical, I mean

Am I correct then that, John, that you're arguing, that you would agree that we in the United States should give this land back to the American Indian because of all those circumstances?

John: They should get something.. In proportion to the size of their people.

They should get something, something of the United States ... and they should get something that is worthwhile and fruitful and that they can live and survive not some junk land down in the desert ... is that correct?

Class: Yes.

Would you agree perhaps maybe Santa Clara Valley? Would you personally, John, be willing to move out of your house and turn it over to the Indians?

Class laughs. ... give Ohio.

Well, that's too easy for John to give away Ohio. Would you give away your home?

John: I wouldn't be happy about it.

No you wouldn't, you would feel wronged if it happened, right?

John: Right.

Would you, would you, if the government came down and said "John Rimenshutter and family, your house has just been given away to an Indian couple." would you feel right in taking some force against that Indian couple at a later time to get your house back?

John: Yeah.

Laurel: I wouldn't, I would ...

Laurel, you wouldn't what?

Laurel: I wouldn't

You wouldn't what?

Laurel: I wouldn't feel comfortable using force to get my house back from the Indian couple. I would go to the government.

John: Well, yeah

Laurel: and, and. Well, but the question was would you feel force ...

Laurel, you're in the UN. Would you vote to give a piece of that land to the Jewish people, or would you vote to give it to the Arabs in its entirety?

Laurel: I really ... I want to be able to feel good about giving that homeland to the Jews.

All right.

Laurel: I think they deserve it ... and I think I would vote no because the Arabs are there and it is Arab land.

So then what do we do with the Jews? It's 1946, 1947.

Laurel: And you know a lot of the time ... Jody was telling me a lot of Jews didn't want to go back to their homes that they've been ... they didn't want to go back to their German homes.

Is that rightfully so? Would you, would you agree that there is logical reason why they would not want to go back?

Laurel: Absolutely, oh absolutely ...

So what do we do with them maybe we've got thousands maybe hundreds of thousands of Jews who were in the camps they don't want to go back to Germany, they don't want to go back to Poland.

Laurel: Maybe ...

John has raised what is actually true, they want to go back to where is their historical place.

Laurel: Right, right

You do not believe that's right, because the majority of the people who live there are Arabs now. So what are we going to do with the Jews?

Laurel: Somehow, uh ...

It's a heck of a dilemma, isn't it?

Laurel: Somehow, split up Israel so that, um, the Arabs, but yea, but, but they didn't do that totally, I mean a lot of, there's like what, in Lebanon there's a lot of there's many camps up there for, for ...

Palestinians.

Laurel: Palestinians and I don't think that that's fair.

OK.

Laurel: And, um, I think somehow both sides ...

In trying to correct one injustice have we created another injustice?

Laurel: Yes!

And do we, do we have in the Middle East, two groups of people who believe rightfully so, that they have been injured, and that there is a solution to their problem and that is that the solution to their problem, for both of them, is to have the land of Palestine? Now the Palestinians feel injured because their land was given away and their solution is to give them back Palestine, and the Jews feel that they have been injured historically and specifically the Holocaust and the solution to them is to give them Palestine. Haven't we got a heck of a dilemma on our hands? Yeah, Katherine.

Katherine: Well, not all of the Jews that live in Israel are survivors of the Holocaust.

I agree.

Laurel: I mean they're from. It's their homeland for people from all around the world so now they can practice freely and have a place, a place to be without being persecuted, and, when I was there, the feeling is that they are more than willing to live with the Arabs only as long as they can just be the, but, the Arabs, it seems that the Arabs only they want to be in there and they don't want they don't, they aren't willing to live with the Jews.

To participate effectively in Socratic questioning, one must:

- listen carefully to what others say
- take what they say seriously
- look for reasons and evidence
- recognize and reflect upon assumptions
- discover implications and consequences
- seek examples, analogies, and objections
- seek to distinguish what one *knows* from what one merely *believes*
- seek to enter empathetically into the perspectives or points of view of others
- be on the alert for inconsistencies, vagueness, and other possible problems in thought
- look beneath the surface of things
- maintain a healthy sense of skepticism
- be willing to helpfully play the role of devil's advocate

III. Role Playing and Reconstructing Opposing Views

A fundamental danger for human thought is narrowness. We do not naturally and spontaneously open our minds to the insights of those who think differently from us. We have a natural tendency to use our native intelligence and our cognitive skills to protect and maintain our system of beliefs rather than to modify and expand it, especially when ideas are suggested that have their origin in a very different way of thinking. We can never become fairminded unless we learn how to enter sympathetically into the thinking of others, to reason from their perspectives and eventually to try seeing things as they see them.

Learning how to accurately reconstruct the thinking of others and how to role play their thinking (once reconstructed) are fundamental goals of critical thinking instruction. Very little work has yet been done in giving students opportunities to role play the reasoning of others. So it is not now clear to what extent or in what forms role playing to enhance critical reciprocity is possible.

But imagine some possible experiments. Students could brainstorm two lists, one list of their reasons for being allowed to stay out late and one for the reasons their parents might give forbidding it. A role play might be devised in which two students would pretend that they were parents and were asked, in that role, to give their reasons why their children should not be allowed to stay out late. It would be interesting to see how accurately the students could reconstruct the reasoning of their parents. They will probably find this challenging and should be encouraged to be as clear as possible in their reasons. Socratically questioning them would reveal more about their thinking. If a student gives the reason that "kids can't be trusted," the teacher might ask, "What does trust mean to you?" Or, "What kinds of things can kids not be trusted to do? Do you

think that all kids are untrustworthy? What circumstances have caused you not to trust one of your kids?" Then one might experiment with a discussion between a student playing "parent" and another student playing "daughter" or "son." The class might subsequently discuss what the best reasons were on each side of the dispute and who seemed to have the stronger argument.

History lessons might also provide opportunities for initial role playing experiences. For instance, students could role play discussions between Northerners and Southerners on disputed questions of the Civil War period or between a member of the British royalty and a colonist concerning the events that led up to the Boston Tea Party.

An interesting follow-up exercise might be to have the students, either in pairs or singly, compose a dialogue on a given issue or on a chosen one. Remind them to brainstorm lists of reasons for both sides of the issue, being sure to focus on the side they don't hold. Then have them write a dialogue expressing the opposing viewpoints. Some of the pairs of students could present their dialogues to the class.

IV. Analyzing Experiences

The necessary role of insights and intellectual virtues — such traits as intellectual empathy, intellectual courage, intellectual integrity, and confidence in reason — in significant learning has been largely ignored in schooling. This deficiency is intimately connected with another one, the failure of schools to help students recognize the need, not only to test what they "learn" in school against their own experience, but also to test what they experience by what they "learn" in school.

We subject little of our experience to critical analysis. We seldom take our experiences apart, to get some sense of their true worth. We seldom separate experiences into their parts of *raw data* and interpretations of the data. Students need to recognize that the same event or situation is often interpreted differently and therefore experienced differently. Failing to recognize the difference between aspects of our experiences, we ignore how the interests, goals, and desires we bring to those data shape and structure our interpretations. Similarly, we rarely seriously entertain the possibility that our interpretation (and hence the total experience) might be selective, biased, or misleading.

The process of developing intellectual virtues and insights is part of developing an interest in taking our experiences apart, in order to recognize when biased subjectivity is distorting our experience. What is more, we need to continually keep in mind the fact that the world is complex and that there are often a variety of legitimate ways to experience the same event or situation. Meta-experiences become important benchmarks and guides for future thought. They make possible modes of thinking and maneuvers in thinking of which the irrational mind is incapable.

To teach for the intellectual virtues, therefore, one must recognize the significant differences between the higher order critical thinking of a fairminded person and the lower order critical thinking of a self-serving person. Though both kinds of thinkers share a certain command of the micro-skills of critical thinking and hence would, for example, score well on tests such as the Watson-Glaser Critical Thinking Appraisal or the Cornell Critical Thinking Tests, they would be unequal at tasks which presuppose the intellectual virtues. The self-serving (weak sense) critical thinker would lack the insights that underlie and support these virtues.

To reason well in domains in which I am prejudiced — hence, eventually to reason my way out of prejudices — I must develop a set of analyzed examples of such reasoning. Of course, to do so, I must see that when I am prejudiced, it seems to me that I am not, and conversely, that those

who are not prejudiced as I am will nevertheless seem to me to be prejudiced — to a prejudiced person an unprejudiced person seems prejudiced. I will realize this only to the degree that I have analyzed experiences in which I have first been intensely convinced that I was correct on an issue, judgment, or point of view, only to find after a series of challenges, reconsiderations, and new reasonings that my previous conviction was, in fact, prejudiced. I must take this experience apart in my mind, clearly understand its elements and how these elements fit together (how I became prejudiced; how I inwardly experienced that prejudice; how intensely that prejudice appeared as insight to me; how I progressively began to break it down by seriously considering opposing lines of reasoning; how I slowly came to new assumptions, new information, and ultimately new conceptualizations).

Only by this special kind of inner experience of reasoning one's way out of prejudices does one gain the sort of higher order abilities a fairminded critical thinker requires. The somewhat abstract articulation of the intellectual virtues will take on concrete meaning in the light of these *analyzed experiences*. We grasp their true meaning only when we take apart our own experience in this way. For example, suppose you had developed a habit of getting angry when other people were late but typically felt justified when you were late. In fact, suppose you felt hostility toward others when they expressed exasperation at your being late. You would probably have a great deal of difficulty in separating your anger and the thinking that fostered that anger from the objective events: you or someone else is late. But if you came to do so, to see inconsistency in your responses to lateness, you could begin to reshape your own responses and be fairer to others. Once we begin to analyze experiences in this way, we begin to develop the insights upon which the intellectual virtues depend.

To generalize, in order to develop intellectual virtues, we must develop a variety of analyzed experiences that represent to us personal models, not only of the pitfalls of our own previous thoughts and experiences, but also of processes we used to reason our way out of or around them. These model experiences must be charged with meaning for us. We cannot be *indifferent* to them. We must sustain them in our minds by our sense of their importance, that they may sustain and guide us in our thought.

What does this imply for teaching? For one thing, it implies a somewhat different content or material focus. Our own minds and experiences must become the subject of our study and learning. Indeed, only to the extent that the content of our own experiences becomes an essential part of what is studied will the "usual" subject matter be truly learned. By the same token, the experiences of others must also become part of our studies. But experiences of any kind should always be critically analyzed, and all students must do their own analysis of the experience to be assessed and recognize what indeed they are doing.

This entails that students grasp the logic of experience and come to see that, for example, every experience has three elements, each of which may require some special scrutiny in the analytic process: 1) something to be experienced (some actual situation or other); 2) an experiencing subject (with a point of view, framework of beliefs, attitudes, desires, and values); and 3) some interpretation or conceptualization of the situation. To take apart any experience, I must ponder three distinctive questions (as well as their interrelation):

- 1) What are the raw facts, the most neutral description, of the situation?
- 2) What interests, attitudes, desires, or concerns am I bringing to the situation?
- 3) How am I conceptualizing or interpreting the situation in light of my point of view?

If students are given a wide range of assignments requiring them to analyze their experiences and the experiences of others along these lines, and are given ample opportunity to argue among themselves about which interpretations make the most sense and why, then they will begin to amass a collection of critically analyzed experiences. As these experiences illuminate the pitfalls of thought, their identification with the analyses will lay the foundation for their intellectual traits and moral character. They will have intellectual virtues because they thought their own way to them and internalized them as concrete understandings and insights. Their basic values and their thinking processes now feed each other. Their intellectual and affective life becomes more integrated. Critical standards for thinking become part of their own thinking rather than external to them in texts, teachers, or the authority of a peer group.

There will be many opportunities in the day-to-day life of school activities to help students develop their intellectual courage, empathy, integrity, perseverance, confidence in reason, and fairmindedness. We need not pressure students to develop these traits, but merely provide conditions which support their growth. The same can be said for fostering essential insights, such as insight into the difference between objective situations and our own special interpretations of them. If we provide situations that call upon students to express their own interpretations while distinguishing basic facts from those interpretations, they will develop crucial insights over time. We must take care, however, not to encourage students to believe either that every interpretation of an event is equally "correct" or that only one interpretation contains *the* truth. Students should learn over time that some interpretations of events are more justified than others (more accurate, relevant, or insightful), while no one interpretation of an event contains *all the truth*.

V. Teaching the Distinction Between Fact, Opinion, and Reasoned Judgment

Many texts claim to foster critical thinking by teaching students to divide all statements into facts and opinions. When they do so, students fail to grasp the significance of dialogical thinking and reasoned judgment. When an issue is fundamentally a matter of fact (e.g., "What is the weight of this block of wood?" or "What are the dimensions of this figure?"), there is no reason to argue about the answer; one should carry out the process that gets us the correct answer. Sometimes this might require following complex procedures. In any case, weighing and measuring, the processes needed for the questions above, are not typically matters of debate.

On the other hand, questions that raise matters of mere opinion, such as, "What sweater do you like better?" "What is your favorite color?" or "Where would you like to spend your vacation?" do not have any one correct answer since they ask us merely to express our *personal preferences*.

But most of the important issues we face in our lives are not exclusively matters of fact or matters of preference. Many require a new element: that we reason our way to conclusions while we take the reasoned perspectives of others into account. As teachers, we should be clear in encouraging students to distinguish these three different situations: the ones that call for facts alone, the ones that call for preference alone, and the ones that call for reasoned judgment. When, as members of a jury, we are called upon to come to a judgment of innocence or guilt, we do not settle questions of pure fact, and we are certainly not expected to express our subjective preferences.

Students definitely need to learn procedures for gathering facts, and they doubtless need to have opportunities to express their preferences, but their most important need is to develop their

capacities for reasoned judgment. They need to know how to come to conclusions of their own based on evidence (facts) and reasoning of their own within the framework of their own perspectives. Their values and preferences will, of course, play a role in their perspectives and reasoning, but their perspectives should not be a matter of pure opinion or sheer preference. I should not believe in things or people just because *I want to*. I should have good reasons for my beliefs, except, of course, where it makes sense to have pure preferences. It does make sense to prefer butterscotch to chocolate pudding, but it does not make sense to prefer taking advantage of someone rather than respecting his rights. Over time, students need to distinguish fact, opinion, and reasoned judgment, since they will never be good thinkers if they commonly confuse them as most students now do. (See the section on Text Treatment of Critical Thinking in "Thinking Critically about Teaching: From Didactic to Critical Teaching.")

In passing, be sure not to confuse this distinction with that of convergent and divergent questions. Questions of opinion and questions of reasoned judgment are both divergent, but the first does not involve the question of truth or accuracy (because it calls for expression of preference), while the second does (since reasoned judgment can be more or less reasonable, more or less prejudiced, more or less justified).

We have put this distinction into the Global Strategies section of this handbook to underscore its importance as a pervasive emphasis in all instruction. In any event, we should always keep in mind global, as well as more specific, strategies in fostering critical thinking. When we habitually play the role of Socratic questioner, habitually seek opportunities to have students reconstruct and role play the thinking of others, habitually encourage students to develop intellectual virtues, and habitually encourage students to distinguish preference from reasoned judgment, we will discover new possibilities for critical thinking instruction and will develop global insights that help guide us in understanding and applying the strategies illustrated more specifically in the lesson remodels that follow.



FILLING THE TOOL BOX

Classroom Strategies to Engender Student Questioning

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Most of the strategies described below have been developed and tested by teachers in Princeton, Madison and elsewhere. They are offered as practical, effective activities that help shift the focus of classrooms from teacher orchestrated mastery and memory of information to student processing of information to create understanding and improve problem-solving.

As one of the primary goals of education is to develop autonomous but interdependent thinkers, students deserve frequent opportunities to shape and direct classroom inquiry. To fuel this inquiry, it is also essential that we validate the importance of curiosity in the process of learning. While curiosity may have killed the cat, there is no reason for us to kill curiosity.

1) Beginning A New Unit (K-12)

If a class is about to spend several days or weeks studying a particular topic or concept, traditional practice and unit design gives the teacher primary responsibility for identifying the key questions and the key answers. The outcome does not have to be a didactic exercise in memory and mastery, if it uses students' curiosity through questioning.

Try starting a new unit by asking your class to think of questions that could be asked about the topic; "What questions should we ask about the Civil War? about stars? about dating? about nouns?"

If students are not used to this type of experience, they are likely to echo the kinds of questions they read at the end of textbook chapters or the kinds of questions teachers generally ask around memory of facts and generalizations. A self-check on the kinds of questions you ask is to try this exercise with your students - they will probably ask the same kinds of questions you usually ask.

If you ask many tantalizing and divergent questions in your classroom, your students are likely to model after your behavior for example, "What would have happened if Lincoln was shot in the first month of the war? Why did Lincoln only free the slaves in the rebel states? How did it feel to be a woman in the path of Sherman's army?"

If on the other hand, they are used to information questions, they may ask, "Which states joined the Confederacy? What were the six main causes of the war? What happened at Shiloh? Who was the Union commander at Shiloh? When did the war end?"

As students begin to suggest questions, it is essential that the teacher restrain judgmental cues. It is better to list questions without verbal or body language comments. Otherwise, students may play a game called "Please the Authority" instead of liberating their curiosity. This is a natural response to criticism whether it comes from the teacher or other students in the class. A key tool in eliminating criticism is brainstorming. The four rules of brainstorming:

1. all contributions are accepted without judgment;
2. the goal is a large number of ideas or questions;
3. building on other people's ideas is encouraged;
4. farout, unusual ideas are encouraged.

As students begin to generate questions in response to your initial question - "What could we ask?" - they will need to be recorded. New questions can come from old ones, as everyone reads them over when they are recorded on chart paper, newsprint or the blackboard. Questions can fly more rapidly than most of us can write, so it is advisable to delegate the writing to student assistants, dividing the blackboard into sections and keeping four students busy. This tactic keeps the pace fast and exciting. Younger children present a different challenge because they need the pacing even more yet cannot help with the writing. In this case it is helpful to enlist a parent volunteer or instructional aide.

Once the questions are listed and the storm of curiosity has subsided somewhat, it is often useful to go through an exercise of categorization, asking the students how they might group any of the questions. These categories can then provide the basis for organizing and structuring the investigation for the next few days or weeks. The list of categorized questions may not include all the original questions if there is overlap among them. This is an appropriate time for some evaluation to take place. Initial efforts may be somewhat clumsy if students are not familiar with the task of categorizing. Ask, "which ideas go together?" Questions about the Civil War may cluster into such groups as People, Causes, Politics, Feelings, Military Strategies and others which do not cover all possibilities or represent a complete set of categories. The skill of creating categories which are mutually exclusive and comprehensive must be taught over time. First efforts need not be precise. Eventually students will use the categorizing step to generate even more questions as they realize that they have omitted a parallel category or the process of categorization leads them to extend one of the categories.

In most cases, the categories students come up with as a result of this process will mirror the standard topics you would have chosen. The fact that they came from the students, however, adds intrinsic motivation for finding the answers. Just as in a teacher-designed unit, categories can form the basis for research teams or they can lead to a succession of class mini-lectures and discussions, depending upon your preference as a teacher. Reading of text can be structured around the categories rather than proceeding in a linear fashion, and it may become necessary to broaden available information beyond textbooks. Teacher and students can organize available supplementary information around the categories.

Once students have categorized questions, you might spend some time asking them to identify which questions seem most interesting and which would be the least interesting. Which questions are the easiest to answer? the hardest? Why? What is it about questions that makes some easy and some hard to answer? This kind of discussion should lead naturally to the development of a Taxonomy or Typology of questions for your classroom (the next activity listed below). Once students begin to label different types of questions, questions become powerful tools for thinking. Thinking about thinking and thinking about questioning both

tend to strengthen the power for student thought.

2. Class Taxonomy of Questions (K-12)

When students begin to label the different kinds of questions, they learn to select different kinds of questions to perform different kinds of thinking. No matter what the level of schooling, some kind of label can work effectively.

Teach students that questions are like tools in a tool box. They would not pull out a screw driver to saw a board. Nor would they use a hammer to unscrew a bolt. Jobs require a choice to tool. Thinking requires a choice of questions. For most students who have never thought consciously about how they think or question, the thinking tools lie unsorted, unlabeled and unidentifiable in the bottom of the box. They tend to reach into the box and pull out the first tool (or question) that comes to hand (or Mind). This leads to hammering instead of sawing, planing instead of drilling.

To introduce students to the idea of categorizing questions, bring in a tool box of tools and ask them to suggest how they might be organized in the toolbox based on what they do. An alternative manipulative activity is to ask students to sort colored shapes into categories based first on color, then on shape, then on both. For older students use figures with multiple characteristics, such as complex geometrical figures, or something familiar and interesting to them such as the latest movies - "Put the last five movies you saw into categories based on how you liked them, their subject matter, their general popularity, their style, their characters, their plot, or their related economic factors."

Primary students may begin with three or four types of questions. As they scan the questions generated at the beginning of a unit, they may come up with types such as "Fact Questions" and "Why Questions" and "Imagine Questions." Or they may find other names. It does not really matter, for the important thing is to start them thinking about questions. The more time you devote to thinking about questions, the more likely they are to discover new types of questions that do not fit nearly into their first typology. The class should then discuss the new type and agree upon the wisdom of including it.

In a similar fashion, middle school and secondary level students can create a typology around their own questions. The labels and types will probably be more complicated, but first efforts will also shift over time as they struggle with questioning.

As students' sophistication with labeling questions grows, it is fun to share the thinking of others in this area. Share Bloom's Taxonomy (1956) and Taba's strategies with your students. Ask them to critique these other models. Ask them to relate them to their own.

And why do we bother with a time-consuming activity like developing a typology of questions? Because once students have the labels, you can lead them to practice each type of question thoughtfully. You can show a film and ask each student to think of three "why?" questions to share with the class at its conclusion. You may assign a story to read and ask for three "inference" questions. Suddenly the students can reach into their questioning tool box and carefully select the saw for sawing and the plane for planing.

3. Questioning Homework (K-12)

Put your classroom questioning typology to work with your homework assignments. If students read an assignment, let them form questions for the next day's discussion. Research substantiates improved comprehension scores for students who question as they read. Ask them to:

- write three comparison questions about the story they are reading;
- find the most interesting question left unanswered by the reading;
- identify the question the author was trying to answer;
- write a question that will demand at least ten minutes of thought to answer;
- find a question which has no answer, or two thousand answers or an infinite number of answers;
- ask a question that is the child of a bigger question that they can then ask the rest of the class to identify.

Ask them to identify the most important and the least important questions. They will discover that in the beginning, there are many unimportant questions, but only a few profound ones. Those that matter grow and expand to give birth to many more of their own kind.

If the homework is skill oriented (algebra problems or word problems), have them jot down three questions that bothered them or stimulated them or intrigued them as they did their work. Ask them to keep track of the question that "got them unstuck" after they had been stuck on a problem for a while. Ask them to list the questions they asked at the end of the assignment to assess the quality of their effort. These are the tools of learning how to learn that enable the student to cope when the standard approach fails. Even knowing that there are alternate routes to a goal can give them the will when they need it to keep searching.

Use the typology to bring meaning to homework and thoughtful involvement to practice. The next day's classroom exchanges will reverberate with enthusiasm once they catch the spirit of inquiry.

4. The Interview (K-12)

Television interviews are a pervasive cultural reality. Every student has a picture of a reporter holding out a microphone to ask questions of an accident victim or a rock star or a politician accused of graft. Questioning is firmly entrenched when it comes to the news media. A wise teacher builds upon such models, for the students readily ape the questioning styles they have seen on television so often. Unlike many textbook publishers, reporters like to ask questions that flow from or stimulate curiosity, because unlike schools, televisions do not have captive audiences. A reporter will ask the victim how he or she is feeling, the rock star why he or she used drugs and the politician why he or she betrayed his or her constituents. Sometimes we are offended by the boundary lines of decency that curiosity compels these people to cross, so a recent rock song portrayed the phenomenon as "We love dirty laundry." We should expect considerably more sensitivity from our students, yet the model can work powerfully for us as we explore the issues surrounding any human event being studied in a classroom.

If your class is about to read a story or see a film about an event, tell them in advance that you will ask one of them to act as one of the main figures in the story or film once it is over. The rest of the class will take turns asking that student interview questions. It is important to ask all students in the class to actually write out at least three questions to ask. Students may otherwise rely upon a small number of highly active and vocal students to carry the effort. Better to embrace all members of the class. Unlike answers, questions carry little risk because the activity has made it acceptable to identify what it is that you do not know. The more typical classroom activity involves concealing what it is that you do not know. When questions are nurtured, admitting a lack of knowledge is rewarded. It is the first step in learning and problem-solving.

5. The Five Minute Question (K-12)

Some questions deserve 10 seconds of thought. Others require days or even months. Great questions span centuries of human civilization (i.e., "why are we here?" "How do we know?" "Can we know?" "How can we know if we know?").

Research into wait-time for American classrooms paints a distressing picture. Many teachers wait less than two seconds for the answer to each question and ask hundreds of questions per hour. These types of questions are generally recall questions demanding little thought.

Label thinking questions by telling a class that a particular question is a one minute or a five minute or a ten minute question. Let them struggle with some of the multi-century questions. Ask them what their minds do when they tackle such questions. Refuse to call on students while they are meant to be thinking. Encourage students to jot down ideas while they are thinking about questions. Encourage them to list other questions that may help answer the original question. Show them how one question may be the grandparent of any other questions. When the time period is over, have them draw pictures of how their minds jumped and moved and considered. Break down the thinking into its elements and show how the process works. Do not allow students to answer profound questions "off the tops of their heads". What do we mean by that expression? If we don't answer from the top, where do we answer from? Show them the structure of thought that should underlie an informed conclusion to a demanding question. Work through the supporting arguments on the chalkboard so they can see that the main idea is supported by a framework of other thoughts. Use metaphors such as tree trunks and roots to help students visualize an otherwise complex process.

6. The Book Report (K-12)

Far too many students pass through school retelling the story of books they have read or summarizing lines from the dust jacket. A favorite book report question is "Tell what you liked about this book and why you would recommend it to a friend." Too often we read responses that go something like, "I would recommend it because it was very interesting to read." These reports can be dreary for all involved, but student questioning can provide a highly desirable alternative. Using the class developed typology, ask students to formulate and answer three questions of their own that fit a particular type (i.e., "Ask three comparison-contract questions.") These questions can provide a refreshing shift from the normal fare. Another approach is to develop a list of book reporting questions as a class activity. Students may then select from a rich menu each time they complete a report.

Critical to all of these activities, however, is some kind of guided practice in how to think through such questions. Introducing one type of question at a time with models of how it can be answered is one way to introduce the thinking skills required. The students' questions as they proceed through the activity provide one guide for their thinking. The teacher's careful analysis of the students' progress in thinking through the questions is the other essential ingredient.

7. Tourist in Trouble (Foreign Language)

Much foreign language drill revolves around student answers to teacher questions. One way to turn this around is to assign students a problem-solving situation as homework. For example, tell students that they are lost on the street in Paris and need to find the way back to their hotel.

What questions would they ask bystanders?

What questions would they be asking themselves?

Who would they ask?

Who could they expect to know the answers to their questions?

Another example would be to tell them they wish to make a hotel reservation but do not know much about the hotel. What questions would they ask of the desk clerk to determine if the hotel meets their needs?

After several of these scenarios are presented by the teacher, students can make them up for others to try (including the teacher!). They can categorize the questions and develop a useful guide for problem-solving with questions. Advanced groups can attempt to find out the necessary information with the fewest number of questions. Other challenges can be to ask only one kind of question, such as fact, or compare/contrast questions; to take turns with someone else asking questions; to limit the vocabulary that the students can use in the questions.

8. Problem-Solving (3-12 Math, LOGO, etc.)

When students are working at math problems and they run into difficulty, some students persevere and untangle the knot of confusion which is blocking them. Many others quickly give up and start waiting in line at the teacher's desk. Sadly, real problem-solving begins when we are stuck. Students must learn the questions to ask which will help untangle the knot. Provide students with a list of "heuristics" (problem-solving strategies) which they should try out before asking for help:

Identifying the problem

"What am I stuck on? What do I need to know?"

Breaking the problem into manageable parts

"What are the smallest pieces I can break this down into and still have it make sense?"

Trial and error (guess and test)

"What might work? What can I try?"

Listing of alternatives

"What are all the things I could do?"

Drawing, charting, graphing, creating a model

"What would this look like in a picture, drawing, in another form, in the form I like best?"

Considering similar problems from the past

"What do I know about that is like this?"

Basic to many of these strategies are questions such as "What do I know? What don't I know? What do I need to know? How can I find out? What is the real problem? What are the parts of this problem? Are some of the parts easier to solve than others? What are the characteristics of this problem? Have I seen others like

it? What strategy worked then? Which strategy do I need now? These are powerful questions which the most powerful thinkers use on the toughest of problems. Students can use such questions to move from trial-and-error to systematic, thoughtful problem-solving. They can empower your students if you encourage them and teach them to use questions as thinking tools.

9. Pre-Writing, First Writing, Re-Writing, Editing (3-12)

Pre-writing, warm-up exercises can flow smoothly if they begin with a question-listing process. One way to avoid writer's block is to allow students to identify all of the questions that might be interesting to explore. If a teacher requests an essay about "loyalty," for example, a student might start by listing such questions as;

"What do I mean by loyalty?"

"What do most people mean by loyalty?"

"When does loyalty become an issue in my life?"

"When was the last time someone was disloyal to me?"

"How well are the ideas connected?"

"Am I assuming that my readers have background in this area?"

The student may find that particular questions are especially appropriate for his or her writing. Certain questions may only apply to non-fiction, others only to poetry. If the class has a bank of editing questions, each student can choose the best questions to use for each occasion.

Working with peer partners for editing is facilitated by questioning. Again, the class can develop a list of helpful questions to ask after reading someone's work. This acts as a guide for students as they work together to give each other advice and help with their writing.

10. On Stage (Music, Art, Athletics, Drama, Speech, etc.)

Performers can be taught to use questions to analyze and evaluate the elements of their performance. The questions are used to identify which aspects need modification, practice or refinement. For example, a singer may tape his or her performance and listen with a questioning ear and mind, asking such questions as:

"How well did I enunciate?"

"Was the temp appropriate?"

"Did I convey the mood I wished?"

This questioning is usually done by the coach or teacher who asks these kinds of questions from past experience with the standard criteria for excellence. A large part of the value of a mentor is the modeling of standard setting that they do. As the student internalizes the questions which point toward high quality performance, they become their own best critics.

The more opportunities you can provide for students to objectify their performance, the better questioners they can become. Audio and videotape, a typed manuscript, a transcription of a conversation help the performer ask and answer questions which will lead to improvement. In order to translate the information into a program of change, questions must convert data into recommendations. They are the vehicles for change.

11. Research Projects (3-12)

Much of the research done in school is topical in nature. Students are asked to "go find out about" a certain person, place, event or topic. The main skill involved is the gathering of information. Students who have been taught to ask questions can use them to accomplish this immediate assignment and to lay the groundwork for doing research which begins with a question. The "go find out about it" research project can begin with students asking questions. Ask them: "What questions can you ask about how to do this assignment?" They may ask such things as:

"Where do I find out about it?"

"Where do I start?"

"Which references are very general to give the big ideas?"

"Which references are too detailed for what I want to know?"

"What resources can I use besides books?"

"How will I know what is important about the topic?"

"How will I know how to organize the ideas?"

Notice that these kinds of questions lead students to develop a plan based on a clarification of their goals and what they know about available resources. The essence of this type of research assignment is finding enough information to give a general description. "A" papers hit all the high points on the topic, are well-organized and well-written. Every student can be guided by the questions which produce a quality description if we give them the questioning tools.

A more meaningful, curiosity driven version of the research project begins with student questions. Students should be able to guide research. The teacher can require types of questions which cannot be answered directly from a book. For example, if a student asks, "Which Civil War general was the best?" the gathering of information eventually leads to a student judgment based upon criteria. This evaluation task involves the student seeking information for the purpose of answering a question he or she posed, a very lifelike and lifelong activity. Instead of an assignment in a High School Health class to "go find out about a topic in human sexuality," students discuss dilemmas in human sexuality such as parenting, birth control and parent/teen conflict. Their research paper assignment is to choose a dilemma to address in detail, presenting both sides of the issue and drawing a personal conclusion. Under the careful guidance of a teacher and with support for answering questions they care about, research papers can become a source of great satisfaction to students.

12. Test-Taking Strategies (K-12)

It should be standard practice to encourage students to read questions before tackling comprehension

passages. After reading the questions, the student should ask questions such as, "What will I be looking for? What clues would guide my skimming? What key words will give away the location of the answers?" A variation on this theme is the questioning, skimming, reading strategy called SQ3R (Survey, Question, Read, Review, Recite). Students must learn to do word searches through passages with a question acting like a magnet sweeping through a pile of junk.

These kinds of questions need to be practiced so that they become a kind of self-talk routine. The more automatically they are engaged, the more confident and successful a student will be when confronted with a test item. Make it a standard practice to have students jot down the questions they asked before reading. You can increase the value of this exercise by including a grade for this part of the assignment. Create opportunities for transfer, giving them test-like exercises in which they make up questions before reading.

Another major test-taking strategy is thoughtful "guessing strategies" which help a student narrow down choices based on their knowledge. These strategies are based on questions such as:

"Are there any answers that are obviously wrong?"

"Are there any words such as 'always,' 'never' or 'completely' which may indicate an answer is too strongly worded."

"What clues may guide me toward the right answer?"

Give students an opportunity to generate these questions and others that they have when confronted with multiple choice questions. Explore the strategies that the questions suggest. This can only strengthen the students' confidence in test-taking and their own toolkit of questions.

13. Divergent and Creative Thinking (K-12)

There are many questions that can help students to "think laterally" (deBono) or "get out of the box." This ability to extend beyond the obvious and the time-worn is an essential ingredient in effective problem-solving because it helps to generate the unusual and imaginative solutions we associate with the skill of synthesis, the rearranging, modifying and combining of elements in novel ways to achieve desired and often startling results.

SCAMPER is one set of questioning strategies that works well. Students can be taught to ask how to change an existing product, item or idea by asking how to Substitute, Combine, Add, (Modify, Magnify, Minify), Put to other uses, Eliminate, and Reverse (Eberle, 1972). SCAMPER tools are used on answers that we already have to questions, when we need a detour in our thinking to see something in a new way. It requires the suspension of judgment and a playful attitude. Many of the ideas will not lead anywhere, but they may add up to be more than the sum of their parts.

To use SCAMPER tools, take the answer to a question such as, "Thoreau wrote Walden" and ask the questions:

S "Who else could have written it?"

C "If Thoreau had had a co-author, who could it have been?"

A "What would Thoreau have written in the 21st century?"

M "What could we modify in the work to intensify the theme?"

P "How does this work apply to the lives of suburbanites?"

E "What would be the effect of eliminating this work?"

R "What would be the antithesis of Thoreau's view?"

One of the benefits of using the SCAMPER tools with students asking the questions is that they both ask and answer the questions. The questions, though often very divergent, require a thorough going knowledge of the required content. Evaluation of student thinking and competency in the subject matter are accomplished through an analysis of the coherence of the question asked, answer given, and next questions posed.

14. Key Words and Question Stems

Students can learn to distinguish between questions by stems which can be listed on a classroom chart. They quickly discover the difference between "how," "what," "when," or "where" as opposed to "why," "what if," "suppose" and "in what ways might". Teachers may then request that students formulate questions with certain stems.

Sometimes questions which start with "why" are fairly easy, at other times, they are unanswerable. What makes the difference? Ask students to propose a reason for the varying difficulty of "why" questions. Are they easier for some people than for others? Why? How does the two-year-old's why differ from last one written here? As students speculate about the answers to these questions, they will refine their use of the tools they know and exercise their muscles as tool shapers and tool makers.

One way to judge the quality of a question stem is how many answers it creates. A question stem such as:

"How is a noun like a tennis match?"

could cause unending discussion exploring the nuances of each. Challenge students to make up questions using a stem that starts the flow of ideas. The longer the ideas keep flowing, the better the question stem was. Try one like the following:

"Just suppose Thomas Jefferson had not participated in the drafting of the Declaration of Independence. What would have happened differently?"

You can convert most textbook-type questions into thought-provoking ones using the SuperThink strategies described in a book by that name (Davis, 1981, DandyLion Press).

15. The Climate

The classroom climate is a key variable in the process of learning through questions. When teachers wind up a strained explanation of a difficult new concept just as the class bell is about to ring and they ask, "Does anyone have any questions?" It is not at all clear to students from the tone and body language that student questions are sincerely desired. On the contrary, the message is that no questions should be necessary, particularly ones which require lengthy or involved answers. Indeed, to ask questions at this point is also to risk the wrath of the students as well as teacher for keeping them from their next class.

There are many alternatives to the "Are there any questions?" approach. The classroom climate which promotes student thinking and questioning has students write down questions at the end of the period. Every student is asked to write an anonymous question that will be answered in writing or verbally the next day in class. Every student can write a question, because the teacher who cares about stimulating curiosity, teaches what is not known as well as what is known. The combination has to produce questions in everyone! Another approach is to pause during a lecture or discussion and ask students to formulate a question about the content just discussed. After a moment to jot down questions individually, pairs of students compare questions and answer the questions. Interesting or unusual questions are shared with the whole group. The exercise should take 3 - 5 minutes and will help ensure understanding and involvement in the material.

But the key to climate is the attitude of teacher toward questions. Are they viewed as digressions, annoyances, to be hurried through, to be answered correctly, to show what students do not know? Or are they tools for the job of learning, toys for playful minds, full of puns, answers for other questions, an indication of powerful thinking, a celebration of curiosity? Are they answered with care, given special place in discussions, written without answers, given without requirements, extended with more questions?

If a teacher desires student questions, they must be greeted with enthusiasm, a commitment of time and an unthreatening manner. As students begin to receive the rewards of asking questions, the phenomenon will occur with increased frequency and quality. If our goal is to teach people how to learn through passing on the best of what we already know, then our best hope is through nurturing curiosity and the tools to quench its thirst.

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Tried and True: September 1997

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.

- 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 students' 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,