

Empowering Colleagues Through Questions

When interacting for professional growth, consider ways you can empower others through questions (e.g., in pre- and post-conferences).

Ask Open-ended Questions:

Open-ended questions that foster reflections enable one to clarify thinking about skills and their applications as well as set goals for continued practice. Useful questions include:

- How did you feel during the lesson?
- What did you notice while students were working?
- What is your perception of student needs?
- What would you consider changing, if anything?

The following table may be used to formulate a variety of open-ended questions:

<p>Question Starter...</p> <p>What did you How do you Could you Would you What is your Tell me</p>	+	<p>Reflection...</p> <p>think feel observe analyze reflect perceive remember notice</p>	+	<p>Content...</p> <p>the lesson the students instructional skills adjustments</p>
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Avoid Pitfalls:

- Avoid saying:
 - "Have you-----?"
 - "Will you-----?"
 - "Why did you-----?"
- Avoid asking:
 - Questions answered with yes or no
 - Leading questions, e.g., "Are you doing that because-----?"
- Avoid probing with:
 - "What went wrong about -----?"
 - Instead say, "What might you do differently about -----?"
- Avoid responding to "the hook" --- being asked for approval or advice.



Remember To:

- Paraphrase ➡ Check accuracy of your perception
- Reflect ➡ Reflect feelings when there's a gap between what was said and how it was said
- Summarize ➡ Along the way and at the end

Adapted from Cooper and Thompson (1990)

ASKING QUESTIONS (continued)

Communication

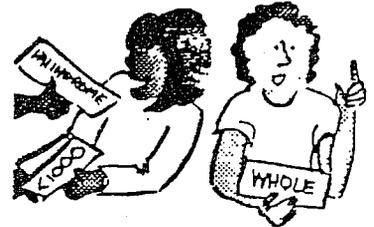
Can students describe or depict the strategies they are using? Do they articulate their thought processes? Can they display or demonstrate the problem situation?

- Would you please reword that in simpler terms?
- Could you explain what you think you know right now?
- How would you explain this process to a younger child?
- Could you write an explanation for next year's students (or some other audience) of how to do this?
- Which words were most important? Why?

Curiosity and Hypotheses

Is there evidence of conjecturing, thinking ahead, checking back?

- Can you predict what will happen?
- What was your estimate or prediction?
- How do you feel about your answer?
- What do you think comes next?
- What else would you like to know?



Equality and Equity

Do all students participate to the same degree? Is the quality of participation opportunities the same?

- Did you work together? In what way?
- Have you discussed this with your group? with others?
- Where would you go for help?
- How could you help another student without telling the answer?
- Did everybody get a fair chance to talk?

Solutions

Do students reach a result? Do they consider other possibilities?

- Is that the only possible answer?
- How would you check the steps you have taken, or your answer?
- Other than retracing your steps, how can you determine if your answers are appropriate?
- Is there anything you have overlooked?
- Is the solution reasonable, considering the context?
- How did you know you were done?

Examining Results

Can students generalize, prove their answers? Do they connect the ideas to other similar problems or to the real world?

- What made you think that was what you should do?
- Is there a real-life situation where this could be used?
- Where else would this strategy be useful?
- What other problem does this seem to lead to?
- Is there a general rule?
- How were you sure your answer was right?
- How would your method work with other problems?
- What questions does this raise for you?

Mathematical Learning

Did students use or learn some mathematics from the activity? Are there indications of a comprehensive curriculum?

- What were the mathematical ideas in this problem?
- What was one thing you learned (or 2 or more)?
- What are the variables in this problem? What stays constant?
- How many kinds of mathematics were used in this investigation?
- What is different about the mathematics in these two situations?
- Where would this problem fit on our mathematics chart?

Self-Assessment

Do students evaluate their own processing, actions, and progress?

- What do you need to do next?
- What are your strengths and weaknesses?
- What have you accomplished?
- Was your own group participation appropriate and helpful?
- What kind of problems are still difficult for you?

Basically there are eight types or categories of probes. (1) open-ended probes. (2) closed-ended probes, (3) neutral probes, (4) reflective statements, (5) leading questions, (6) summary statements, (7) brief assertions, and (8) pauses. Below are explanations and examples of the eight categories.

Open-ended Probes

Question or request to elicit a broad response. They encourage the person to expand and invite longer more inclusive responses. Key words: How, What, Why.

- Examples: (1) What did you like about the lesson?
(2) Tell me about the sequence you used.

Pauses

Planned silence--lets you and the other person collect and formulate thoughts. Slows down the interaction and often draws the other person out.

Reflective Statements

Provide an opportunity to assert awareness and understanding without indicating agreement. They mirror positive or negative feelings but often are used to react to the teacher who has indicated confusion or anger.

- Examples: (1) You're obviously pleased with the lesson.
(2) You don't think it's fair?

Neutral Probes

A question or statement that encourages the other person to elaborate on some aspect of a topic being discussed. Similar to open-ended probes but they *channel* the dialogue.

- Examples: (1) Tell me why you used seatwork.
(2) Expand on your comment about homework.

Brief Assertions

Very short statement, question, sound, or gesture to encourage the teacher to continue talking, to elicit information and to demonstrate that you're listening.

- Example: (1) I see--Keep going--that's interesting, Boy! Wow! Gosh!

Closed-ended Probes

Question worded to elicit a very short, precise response to determine extent of or check on opinions and facts.

- Examples: (1) Would you prefer to use lecture or the role play?
(2) Is there a chance you're going too fast?

Leading Questions

A query that allows only one reasonable answer--to check your own understanding and move the other person to action.

- Examples: (1) But wouldn't it make more sense to use the role play?
(2) But the kids seem to really get involved in the role play don't they?

Summary Statement

Brief rephrasing of information aimed at paraphrasing facts, opinions, ideas, or information (not feelings) of the teacher.

- Examples: (1) As I see it you would rather use drill and practice because of the type of students you have.
(2) Let's see if I've got this straight...

In summary, probes can be used for three main purposes: to demonstrate interest, understanding, and empathy.

Interest

Open and Probe
Pauses
Neutral Probe
Brief Assertion
Closed-ended Probe

Understanding

Reflective Statements
Summary Statements
Leading Questions
Closed-ended Probe

Empathy

Reflective Statements
Summary Statements

CHARACTERISTICS OF EFFECTIVE QUESTIONS

Questions which may be answered by a YES or NO should not be asked

Questions should have a specific purpose and be relevant to the subject

Questions should be stated as briefly as possible, and in the language of the learner

Questions should be restricted to one main thought, and not linked to other questions

Questions should be addressed to the entire group in order to obtain the maximum amount of active participation. If it is desired that a specific person answer, name the person after the question has been stated

Questions should be directed at the group randomly with an even distribution, and no particular order

Questions should not be used to antagonize the learner(s)

Questions should always be "answerable"

ASK QUESTIONS USING PLEASANT FEELING TONE

ALLOW THE LEARNER TO RESPOND WITHOUT INTERRUPTION

ALLOW PROCESSING TIME FOR THE LEARNER BEFORE REQUESTING AN ANSWER

HANDLING QUESTIONS

- * Some you will answer immediately.
- * Some you won't answer at all.
- * In answering questions you should be certain that you reply the question that was stated.
- * Don't evade the question.
- * If the question is not clear to you, ask to have it rephrased or ask for some additional information.
- * In a small group, everyone will probably hear the question. If the question is not heard by everyone, repeat it.
- * The reverse question technique can be used if you want to get the individual or group to do some thinking.
- * You may be asked a question you can't answer. Simply state that you don't know. You can offer to find out and let the person know. There's nothing wrong with admitting that you don't know or calling on someone else.
- * If it is a question that will be answered later in the session, tell the group this.
- * If it is an irrelevant question or one you shouldn't answer, simply state that it is something which does not pertain to the current subject.

Divergent Questioning Models

QUESTIONS TO USE IN YOUR CLASS

QUANTITY QUESTIONS

1. List all of the _____.
2. List as many _____ as you can think of.
3. How many ways can you come up with _____?

REORGANIZATION QUESTIONS

1. What would happen if _____ were true?
2. Suppose _____ (happened), what would be the consequences?
3. What would happen if there were no _____?

SUPPOSITION QUESTIONS

1. Suppose you could have anything you wanted in working on this. What ideas could you produce if this were true?
2. You can have all of the _____ in the world. How could you use it to _____?
3. You have been given the power to _____. How will you use it?

VIEWPOINT QUESTIONS

1. How would this look to a _____?
2. What would a _____ mean from the viewpoint of a _____?
3. How would _____ view this?

INVOLVEMENT QUESTIONS

1. How would you feel if you were _____?
2. If you were _____ what would you (see, taste, smell, feel)?
3. You are a _____. Describe how it feels?

FORCED ASSOCIATION QUESTIONS

1. How is _____ like _____?
2. Get ideas from _____ to improve _____.
3. I only know about _____. Explain _____ to me.

Questioning DOs and DON'Ts

DOs for Teacher Questioning

1. Allow "perk time" for the student to think.
2. Say as little as possible. Listen to the student's ideas and try not to impose your own. Sometimes students say what they think you want to hear rather than what they're really thinking.
3. Seek reasoning behind responses.
4. Ask questions such as "why?" "What proof do you have?" "Does this fit the given?" Probe for the rationale and/or the logic of conclusions, for example, "Can you tell me more about your ideas?" "You're going in the right direction." "Check whether your ideas all deal with the givens."
5. Ask leading questions without dictating the direction. Without giving value judgements, encourage students to expand on their own ideas. Ask "What do you mean?" as opposed to "Do you mean...?" Try "This is a great idea, can you expand it?" "Super stuff; what difficulties did you have getting to this point?"
6. Accept any justifiable response or solution to a card as long as it fits the givens and problem.
7. Be flexible and open to new ways to use the kit.

DON'Ts for Teacher Questioning

1. Don't ask questions that call for simple yes or no responses.
2. Don't expect instant responses.

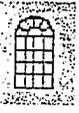
A Simulation of Student-Teacher Interaction

Following is a simulated response to a typical activity card problem, including a sample card, possible initial student responses, and teacher reactions.

This simulation is not intended to limit your individual approach to the program. It is an example only of how an activity might be processed.

Facilitator Notes for CCPL: Questioning for Understanding Module

Exercise	Time	Exercise Topic	Transparencies	Handouts	Charts	NOTES
1	10	Intro	T-1		Agenda Itinerary	
2	15	Purpose	T-2-3-4		Reasons for asking ?	
3	5	Definition	T-5		Definition	
4	25	4 Types of ?		HO-1-2	4 Categories	Article: ? Skills for Tea. pg.6-7, Tool Box pg.3
5	20	? That Promote Thinking	T-6	HO-2	4 Categories	Video: Egyptian Civilization <i>[Handwritten signature]</i>
6	15	Aligning ? <i>align to own class all have mind.</i>	T-7	HO-3		Lesson Design- <i>Now or Later</i>
7	5	Discourse	T-8			
8	30	Interaction	T-9	HO-4- 5-6	5 Categories	Video: Kangaroos
9	10	Students ask ?	T-10-11-12		Interaction- Response Model	Video: Bridges, Lit. Circle Place Mat Activity Demonstration-Role Play
10	30	Teach St. to ask ?	T-13	HO-7-8	L'Engel Quote	Swap Shop Activity Articles: Quilt, The Flip Side, Reciprocal Teaching
11	5	Self-Asses Peer-Obs		HO-9- 10		
12	10	Summary	T-14	HO- Rubric		Rubric Structures, Strategies, and Skills



DIVISION OF INSTRUCTIONAL DEVELOPMENT

Division Home

INTERACTION SKILLS

Services:

Questioning

Other Services

Effective use of communication skills by both instructors and students is conducive to the development of positive interaction in the classroom. In order to have successful exchanges between instructors and students:

- Climate*
1. Students should feel free to ask questions of the instructor and their peers.
 2. Students should feel free to answer questions.
 3. Students should not feel threatened by giving an incorrect response.

In this section we will consider some of the components of successful interactions including:

1. Physical setting
2. Instructor attitude
3. Hints for calling on students to maximize student participation
4. Wait-time after asking questions
5. Handling student responses to questions
6. Responding to students' questions

Physical Setting

The instructor needs to be aware of the acoustics of the room in which he teaches. Can students hear you when you ask a question? Can students hear other students ask and answer questions?

1. If you teach in a large lecture hall and want to foster participation, it is a good idea to move students close to each other and close to the front of the room.
2. Facilitate interaction in a small seminar group by arranging students in a circle so that they face each other.
3. In a lab setting make sure students do not begin working on their own until you have finished the lecture/discussion part of the session. It is difficult for students to interact if they are not attentive or if other students are using equipment.

Instructor Attitude

An important aspect of atmosphere is "attending behavior" or what an instructor does while a student answers a questions. Generally the instructor should be listening to the student, encouraging him to continue, and helping to focus the attention of the class on the student who is responding to the question. This can be accomplished in several ways:

1. Maintain eye contact with the student answering. Some instructors find that they also glance around the room from time to time to determine whether class members are listening.
2. Use nonverbal gestures to indicate your understanding, confusion, or support--head nodding, facial expression, hand gestures which signal the student to continue, or physical stance which indicate that you are thinking about the student's answer.
3. Listen to the student! Do not interrupt even if you think the student is heading toward an incorrect answer. At times a student may realize his own mistake. On other occasions you may simply have misunderstood where the student was going with his answer. Even on the frequent occasions when a student does reach an incorrect answer the other students may learn as much from the incorrect response as from a correct one. Furthermore, interrupting students does not create an atmosphere which encourages participation. You might try using some of these active listening suggestions:
 - o Wait for a second or two following a student response to be sure that you have listened to everything and that the student has finished talking.
 - o You might wish to paraphrase a long answer and check with the student to be sure your perception of his response is accurate. This technique, when judiciously applied, makes students aware that you are listening.
 - o Use the student response to lead to the next question or to make a point. Again, this demonstrates that you are listening.
 - o While listening to the student try to determine whether you do understand his point. If you don't understand, ask for more information of explanation.
 - o Listen for the content of what the student is saying, not simply for expected jargon or key phrases.
 - o Focus your attention on the student, not on what you intend to do next (i.e., ask a question, or end the class).

Calling on Students to Maximize Participation

1. Call students by their names as opposed to pointing in their general direction. This avoids confusion as to who was called upon and also helps create a positive climate where students feel you know them as individuals.
2. Ask questions of the entire class and try to encourage all students to participate. The advantage of calling on only volunteers is that it may be less threatening. A disadvantage of calling on only volunteers is that a small number of students will be answering all your questions. It is possible to call on nonvolunteers in a nonthreatening manner by:
 - o Speaking in a tone of voice which is friendly.
 - o Using positive nonverbal cues, while calling on the person, e.g., smiling, eye contact.
 - o If the nonvolunteer is incorrect or cannot respond, accept his nonresponse without insulting him. Perhaps ask if another student in the class can help him out.

Example:

Kate: I don't know.

Instructor: O. K., can anyone help Kate out?

3. In order to encourage nonparticipants, call on specific students to answer questions. You can phrase a question, then call on the student. If you call the student's name first, the rest of the class may not listen to the question.
4. Make an attempt to randomly select students to respond. Try not to follow any set pattern when calling on students. For example, if you call on each student in a row, students learn to listen only when it's close to their turn to answer.
5. Try to avoid repeating all student responses. Teacher repetition causes students to learn to listen to you, not their fellow students. In addition, hearing each response twice is boring.
6. Beware of the student who dominates in class by asking or answering all the questions. Try to encourage other students to respond by suggesting others volunteer or by calling on nonvolunteers.
7. Give students an opportunity to ask questions. Do not use "Any questions?" as your only form of feedback from students. Sometimes

students are so confused they cannot even formulate a question. In addition many students will not participate because they do not want to make mistakes in front of their peers.

8. ~~Avoid asking all of your questions at the end of the session.~~ If a student was lost at the beginning, he has missed an entire session by the time you have asked a question. Students may also be less willing to answer at the end of the session as they are getting ready to leave.
 9. ~~Avoid looking down at notes after asking a question.~~ You should be looking for volunteers and noting confusion or understanding of students.
 10. ~~Your nonverbal reactions should complement your verbal responses.~~ For example, it is usually ineffective to say "good point" while looking away or reading notes.
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Wait-time

One factor which can have powerful effects on student participation is the amount of time an instructor pauses between asking a question and doing something else (calling on a student or rewording the question).

Research on classroom questioning and information processing indicates that students need at least three seconds to comprehend a question, consider the available information, formulate an answer, and begin to respond. In contrast, the same research established that on the average a classroom teacher allows less than one second of wait-time.

After teachers were trained to allow three to five seconds of wait-time the following significant changes in their classrooms occurred:

- The number of students who failed to respond when called on decreased.
- The number of unsolicited but appropriate responses increased.
- The length of student responses increased.
- The number of student statements where evidence was used to make inferences increased.
- The number of responses from students identified by the teacher as less able increased.
- The number of student-to-student interactions increased.
- The number of student questions increased. (Rowe, 1974)

Allowing wait-time after a student response or question also produced significant changes in classroom interaction. The most notable change was that the instructor made fewer teaching errors characterized by responding illogically or inappropriately to a student comment.

On the other hand, too much wait-time can also be detrimental to student interaction. When no one seems to be able to answer a question, more wait-time will not necessarily solve the problem. Experts say that waiting more than 20-30 seconds is perceived as punishing by students. The amount of wait-time needed in part depends upon the level of question the instructor asks and student characteristics such as familiarity with content and past experience with the thought process required.

Generally lower-level questions require less wait-time, perhaps only three seconds. Higher-level questions may require five seconds or more. With particularly complex higher-level questions some instructors tell student to spend two or three minutes considering the question and noting some ideas. Other instructors allow five to ten seconds of thinking time and then ask students what processes they are using to investigate the questions; this strategy makes students aware that thought process is at least as important as an answer and that alternative processes can be applied to arrive at an answer to the same question.

Handling Student Responses

An important aspect of classroom interaction is the manner in which the instructor handles student responses. When an instructor asks a question, students can either respond, ask a question, or give no response. If the student responds or asks a question, the instructor can use one of the following recommended questioning strategies: rein-force, probe, refocus, redirect. If the student does not respond the instructor can use either a rephrase or redirecting strategy. A description of each strategy follows:

1. *Reinforcement.* The instructor should reinforce in a positive way student responses and questions in order to encourage future participation. The instructor can reinforce by making positive statements and using positive nonverbal communication. Proper nonverbal responses include smiling, nodding, and maintaining eye contact, while improper nonverbal responses include looking at notes while students speak, looking at the board or ruffling papers.

The type of reinforcement provided will be determined by:

- o The correctness of the answer. If a student gives an answer which is off target or incorrect, the instructor may want to briefly acknowledge the response but not spend much time on it and then move to the correct response.

- o The number of times a student has responded. Instructors may want to provide a student who has never responded in class with more reinforcement than someone who responds often.

CAUTION: Vary reinforcement techniques between various verbal statements and nonverbal reactions. Try not to overuse reinforcement in the classroom by overly praising every student comment. Students begin to question the sincerity of reinforcement if every response is reinforced equally or in the same way.

2. *Probe.* Probes are based on student responses. The initial response of students may be superficial. The instructor needs to use a questioning strategy called probing to make students explore initial comments. Probes are useful in getting students more involved in critical analysis of their own and other students' ideas.

Probes can be used in different ways. Probes can be used to:

- o Analyze a student's statement, make a student aware of underlying assumptions, or justify or evaluate a statement.

Example:

Instructor: What are some ways we might solve the energy crisis?

Student: I would like to see a greater movement to peak-load pricing by utility companies.

Instructor: What assumptions are you making about consumer behavior when you suggest that solution?

- o Help students deduce relationships. Instructors may ask student to judge the implications of their statements or to compare and contrast concepts.

Example:

Instructor: What are some advantages and disadvantages of having grades given in courses?

Student 1: Grades can be a motivator for people to learn.

Student 2: Too much pressure on grades causes some students to stop learning, freeze, go blank.

Instructor: If both of those statements are true, what generalizations can you make about the relationship between

motivation and learning?

- o Have students clarify or elaborate on their comments by asking for more information.

Examples:

Instructor: Could you please develop your ideas further?

Instructor: Can you provide an example of that concept?

Student: It was obvious that the crew had gone insane.

Instructor: What is the legal definition of insane?

Student: It was a violation of due process.

Instructor: Can you explain why?

3. *Adjust/Refocus.* When a student provides a response which appears out of context the instructor can refocus to encourage the student to tie her response to the content being discussed. This technique is also used to shift attention to a new topic.

Example:

Instructor: What does it mean to devalue the dollar?

Student 1: Um--I'm not really sure, but doesn't it mean that, um, like say last year the dollar could buy a certain amount of goods and this year it could buy less--does that mean it devalued?

Instructor: Well, let's talk a little bit about another concept, and that is inflation. Does inflation affect your dollar that way?

4. *Redirect.* When a student responds to a question, the instructor can ask another student to comment on his statement. One purpose of using this technique is to enable more students to participate. This strategy can also be used to allow a student to correct another student's incorrect statement or respond to another student's question.

Examples:

Instructor: Bill, do you agree with Mark's comment?

Instructor: From your experience, Roger, does what Carol said seem true?

Instructor: Blake, can you give me an example of the concept that Pat mentioned?

-
5. *Rephrasing.* This technique is used when a student provides an incorrect response or no response. Instead of telling the student she is incorrect or calling upon another student, the instructor can try one of three strategies:

- The instructor can try to reword the question to make it clearer. The question may have been poorly phrased.

Example:

Instructor: What is neurosis?

Student 1: (No response).

Instructor: What are the identifying characteristics of a neurotic person?

- The instructor can provide some information to help students come up with the answer.

Example: Instructor: How far has the ball fallen after 3 seconds, Ann?

Student: I have no idea.

Instructor: Well, Ann, how do we measure distance?

- The instructor can break the question down into more manageable parts.

Example: Instructor: What is the epidemiology of polio?

Student: I'm not sure.

Instructor: What does "epidemiology" mean?

Responding to Student Questions

There are many ways in which an instructor can respond to questions from students. However, all strategies begin with this important step:

LISTEN TO THE STUDENT'S QUESTION.

This is another time to use your active listening skill (See *Instructor Attitude*).

After you are certain you understand the question, be sure that other students

have heard and understood the question. Strategies from this point include:

1. Answer the question yourself. This strategy is best when you have little time remaining in class. The disadvantage of this approach is that you do not encourage student-to-student interaction or independent learning.
2. Redirect the question to the class. This strategy helps to encourage student-to-student interaction and to lessen reliance on the instructor for all information.
3. Attempt to help the student answer his own question. This may require prompting through reminders of pertinent previously learned information. Or this strategy may require you to ask the student a lower level question or a related question to begin his thought process. The advantage of this strategy, as in redirecting, is that the student may learn the process of searching for answers to his own questions rather than relying on the teacher. The risk is that the process can be embarrassing or so threatening that the student will be too intimidated to ask questions in the future. Obviously some human compassion is called for when using this strategy.
4. Ask the student to stop after class to discuss the question. This strategy is most appropriate when a student raises complicated tangential questions or when a student is obviously the only one who does not understand a point and a simple answer does not clarify the point. Even in these situations there are risks in using this strategy. Students may be intimidated from raising questions in class. The instructor may think that only the questioning student does not understand when actually a number of students are having the same problem.
5. Refer the student to a resource where she can find the answer.
6. Defer the question until a more appropriate time but **NOT THE QUESTION AND THE STUDENT; RETURN TO THE QUESTION** at an appropriate time.

No matter which strategy you use you should return to the student after addressing the questions and determine whether the response has satisfied the student.

If you don't know the answer to a student question **NEVER FAKE AN ANSWER**. Admit that you cannot answer the question and then select one of these strategies or others you find appropriate:

1. Ask whether someone in the class can answer the question. Most times after class you should follow this with an attempt to determine whether the information provided was accurate or based on sound reasoning and credible sources.

2. Either propose a plan for obtaining evidence for answering the question or ask the students to suggest how the question could be investigated.
3. If possible, suggest a resource where the student can find information. The resource may be written material, another faculty or staff member, a student, or someone from the community.
4. Volunteer to find the answer yourself and report back to the class. Make sure you actually do return with the answer if you choose this option.

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DIVISION OF INSTRUCTIONAL DEVELOPMENT

Division Home

METHODS FOR ASSESSING QUESTIONING SKILLS

Services:
Questioning

Other Services

This section of the booklet presents four methods for collecting feedback related to one's questioning skills. These include self-review, colleague or peer review, survey, and student evaluations of questioning. An instructor can use the information gathered from one or more of the methods to identify strengths and weaknesses in her questioning techniques.

Assessment Method page

- Videotape Self Review
- Peer-Review
- Survey on Questioning
- Student Evaluation of Questioning Skills
- Suggestions for Interpreting Collected Assessments

Videotape Self-Review

Suggestions for Viewing Your Videotape

(Call the Division of Instructional Development at (217) 333-3370 to make arrangements for videotaping your class.)

1. Focus your attention on a few aspects of your questioning techniques which are of particular interest to you. Select one or both of the following rating guides to concentrate on while you view your videotape.

Level and Types of Questions
Attending Behaviors

Space has been provided at the bottom of each rating guide for additional comments which come to mind as you view the tape.

Level and Types of Questions

Directions: Respond to each of the statements below by writing next to the statement the number which most closely corresponds to your observation.

0. = Not Applicable

1. = Needs Improvement

2. = Satisfied

3. = Very Satisfied

1. Asked questions which were appropriately phrased and understood by students.
2. Asked questions which were at an appropriate level for the materials being covered.
3. Asked questions which required students to think at various levels of the taxonomy.
4. Questions followed a logical pattern.
5. Student responses were consistent with intended goals or objectives of the questions.
6. Asked questions which monitored student progress.
7. Encouraged students to answer difficult questions by providing cues or rephrasing.
8. Asked probing questions if a student's answer was incomplete or superficial.
9. Used rhetorical questions to gain student's attention.
10. Avoided "implied response" type questions.

Other Comments:

Attending Behaviors

Directions: Respond to each of the statements below by writing next to the statement the number which most closely corresponds to your observation.

0. = Not Applicable

1. = Needs Improvement

2. = Satisfied

3. = Very Satisfied

Atmosphere

1. Addressed questions to individual students as well as the group.

2. Called on students by name.
3. Called upon students in a friendly non-threatening manner.
4. Paused after all questions to allow students time to think of an answer (wait-time).
5. Avoided interrupting students during questions or responses.
6. Patiently handled incorrect responses.
7. Checked understanding of unclear student responses or questions by paraphrasing.
8. Allowed and encouraged students to ask questions.
9. Received student questions politely and when possible enthusiastically.
10. Avoided using a condescending or put-down tone when responding to student answers or questions.

Reinforcement

11. Demonstrated active listening skills (e.g., eye contact, head nodding) when interacting with students.
12. Used positive nonverbal cues (e.g., smiling, friendly voice) when students were responding.
13. Clarified, built upon, or developed ideas suggested by students.
14. When necessary, asked students to clarify their questions.

Other Comments:

2. When viewing the videotape of your lesson take advantage of the rewind capabilities of the equipment to replay segments of interest or importance. One recommendation is to stop the tape after posing a question: Anticipate the student response. Continue playing the tape and compare the actual student response with the anticipated response. If there was any inconsistency, try to identify the factors which may have contributed to the question not working as planned.
3. Consider the following questions after viewing your videotape:

- o How do your observations and data generated from the Self-Rating Guides compare with your intended goals and purposes of your questions?
- o Are your questioning outcomes consistent with your intent?

Using Audiotape Recording to Assess Your Questioning Effectiveness

Occasionally, people who haven't been videotaped before feel anxious or reluctant to use this medium to analyze their teaching. If you feel being videotaped will create excessive anxiety, thus affecting your teaching, perhaps a less threatening alternative would be to audiotape your lesson with a cassette tape recorder. Cassette tape recorders are unobtrusive and fairly easy to operate. As with the videotape recorder you can stop, replay, or fast forward the lesson, focusing upon areas of specific interest. You should be cautioned that cassette recorder microphones may be less effective than videotape recorders when picking up student comments, especially in larger rooms. Secondly, when listening to an audiotape you must visualize the nonverbal and attending behaviors occurring during the lesson. Keep in mind that in many instances what we think is, or was, occurring is not necessarily consistent with what did occur.

Peer Review

Conducting a Mini-lesson

The purpose of peer teaching is to provide you with an opportunity to apply some of the suggestions mentioned in this booklet. Applications of these suggestions should occur in an informal and nonthreatening atmosphere.

WHO IS INVOLVED?

You (the instructor) and one to three professional colleagues who have volunteered to provide you with support and assistance in analyzing and refining your teaching skills.

WHAT AND WHY?

Identify a few specific goals or questioning skills you wish to incorporate into a short 10-20 minute lesson which will be presented to your colleagues. Your colleagues help by:

1. Discussing your goals or objectives with you.
2. Participating as learners during the lesson.
3. Organizing their observations.

4. Analyzing your questioning feedback.
5. Providing constructive feedback.
6. Helping you develop a strategy for making your instruction more effective.

WHAT IS IN IT FOR YOUR COLLEAGUES?

Some of the ideas and approaches you will be testing may also be new to one or more of the group. Through active participation and exposure to these concepts, your peers may learn more about their own teaching.

AVAILABLE OPTIONS

There are three ways peer teaching can be conducted:

1. As traditional peer teaching: one instructor presents a lesson to a few colleagues.
2. As videotaped peer teaching: the same framework as above, except the lesson is videotaped to provide you with an additional source of feedback.
3. Same as #1, or #2 but led by an educational specialist from the Office of Instructional and Management Services.

Anyone interested in making arrangements for options #2 or #3 should contact the Office of Instructional and Management Services at (217) 333-3370.

SUGGESTIONS FOR USING THE PEER TEACHING CYCLE

Pre-Teaching Conference

The pre-teaching conference provides you with an opportunity to meet with your peer group and communicate your goals and the procedures to be followed. Awareness of your goals will help each participant focus upon how well your goals are reflected in your teaching. Group members can also suggest ways in which they may provide feedback related to your specific goals.

Teaching Session

Plan your presentation to take between 10-20 minutes. Remember, this is a "mini-teaching" exercise. Plan accordingly. Select and focus upon only a few suggestions presented earlier in this booklet. Encourage your group to participate as if this were an actual learning situation. Discourage role playing.

Analysis

After completing your mini-lesson, allow yourself a few minutes to jot down some notes concerning your impressions and analysis of the lesson. These impressions will later be shared with the group.

Each member of the group should complete the feedback form presented below and summarize his observations according to the specific goals discussed during the pre-teaching conference.

Mini-Lesson Feedback

Directions: Respond to each of the statements below by writing next to the statement the number which most closely corresponds to your observation.

- 0. = Not Applicable
- 1. = Not Adequate
- 2. = Somewhat Adequate
- 3. = Adequate
- 4. = Very Adequate

I. Demonstrates Skill In Asking Appropriate Levels and Types of Questions.

- 1. Asked questions which were at an appropriate level for the material being covered.
- 2. Questions followed a logical pattern.
- 3. Questions served a purpose.
- 4. Asked questions which required students to think at various intellectual levels.

II. Demonstrates Skill in Phrasing Questions and Handling Student Responses.

- 1. Allowed adequate wait-time after posing questions.
- 2. Demonstrated active listening skills (e.g., eye contact, head nodding) when interacting with students.
- 3. Reinforced student responses.
- 4. Avoided interrupting students during questions or responses.

Use this space to write strengths and weaknesses you observed in the

instructor's questioning techniques.

STRENGTHS

WEAKNESSES

Conference/Critique Session

During this session you and the group share your observations and analysis of the lesson. Try to:

1. Focus on the predetermined areas of concern, e.g., levels and types of questions, phrasing questions.
2. Focus on a few areas, not many.
3. Focus on positive as well as negative aspects of the lesson.
4. Support observations with data taken from the lesson (quotes, critical incidents).

Post-Conference Planning

The purpose of this session is to provide you with time to reflect upon comments made by the group and compare them with your own observations. You should decide which feedback is most useful and incorporate that information into a plan or strategy for a future lesson. You might consider using a continuing series of peer teaching exercises, each growing out of a preceding one and leading to the next. By following this cycle, information and data generated from one session may be applied to another.

COLLEAGUE VIDEOTAPE REVIEW

The purpose of colleague videotape review is to provide you with additional expert perspectives about one of your videotaped lessons. Colleagues in your area of academic interest can be a good source of helpful information.

WHO IS INVOLVED?

You (the instructor) and one to three colleagues who will provide you with assistance in analyzing a videotape of your classroom teaching.

WHAT IS INVOLVED?

Arrange to have a videotape made of your classroom teaching. Ask your colleagues to view the tape and provide you with their impressions. They can expect to spend approximately an hour observing the tape and another hour discussing and reviewing with you selected parts of the tape.

WHAT IS IN IT FOR YOUR COLLEAGUES?

Some of the ideas and approaches you will be testing may also be new to one or more of the group. Through active participation and exposure to these concepts, your-peers may learn more about their own teaching.

PROCEDURAL OPTIONS:

1. You should ask your colleague(s) to concentrate on specific aspects of your lesson chosen from the Rating Guides presented earlier. The Rating Guides for each category can be completed by your colleagues as they view your videotape.
2. If more than one colleague is looking at the tape, they may want to get together before meeting with you to organize their comments, save time and avoid redundancy.

HOW?

If you call the Instructional Development Division of the Office of Instructional and Management Services at (217) 333-3370 you can make arrangements for videotape and playback equipment. If you wish, the staff can also suggest colleagues who may be willing to watch your videotape.

Survey on Questioning

The following survey can be used to provide you with quick and efficient systematic information concerning students' perceptions of the "questioning/interaction" atmosphere in your classroom.

SURVEY ON QUESTIONING

Directions: Respond to each of the statements below by circling the response which most closely corresponds to your observation.

1. How would you characterize communication in your class?
 - a. As an uninterrupted lecture by the professor?
 - b. As a lecture where members of the class sometimes raise questions about the material being presented?
 - c. As a lecture where the professor and/or class members often stop to discuss the material being presented?
 - d. Other: (Specify on back)
2. I feel free to ask questions when I do not understand a point the instructor is making.
 - a. Usually

- b. Sometimes
 - c. Seldom
3. The questions presented to the class are generally:
- a. Too difficult
 - b. About right
 - c. Too easy
 - d. Other (Specify on back)
4. During the class, the instructor asks questions to determine if we understand the presentation.
- a. Usually
 - b. Sometimes
 - c. Seldom
 - d. Not applicable
5. The instructor adjusts the presentation based upon student feedback during the lesson.
- a. Usually
 - b. Sometimes
 - c. Seldom
 - d. Not applicable
6. The instructor misunderstands student questions.
- a. Usually
 - b. Sometimes
 - c. Seldom
7. The instructor answers questions clearly and concisely.
- a. Usually
 - b. Sometimes
 - c. Seldom
8. The instructor is patient with students who ask questions.
- a. Usually
 - b. Sometimes
 - c. Seldom
9. Do you feel comfortable responding to questions in this class?
- a. Usually
 - b. Sometimes
 - c. Seldom

d. Not applicable

Student Evaluation of Questioning Skills

Using ICES Questionnaire Items to Assess Your Questioning Skills

The following set of ICES (Instructor and Course Evaluation System) questionnaire items can be used to assess your questioning skills. The items are presented with their original ICES catalogue number. You are encouraged to include one or more of the items on the ICES evaluation form in order to collect students' opinions of your questioning skills.

33--How much time was allotted to classroom questioning and discussion?
Too much - - - - - Too little

328--Did the instructor raise challenging questions in class?
Yes, Often - - - - - No, Seldom

329--Questions presented to the class to generate discussion were generally:
Too specific Too vague

331--The instructor asked open-ended questions..
Almost always occurred - - - - - Almost never occurred

333--The instructor was receptive to differing viewpoints or opinions..
Yes, quite open - - - - - No, didn't want them

336--Did the instructor clarify student ideas by inflection (e.g., said "Do you mean...").
Almost always - - - - - Almost never

341--During presentations, did the instructor check on students' understanding?.
Almost always - - - - - Almost never

354--The instructor listened attentively to what class members had to say..
Always - - - - - Seldom

359--How often did the instructor understand your comments or questions?.
Almost always - - - - - Almost never

363--The instructor corrected student statements without further discussion..
Almost always occurred - - - - - Almost never occurred

366--The instructor thoroughly answered students' questions..
Almost always - - - - - Almost never

379--The instructor was condescending toward students.

Strongly agree - - - - - Strongly disagree

390--There was a positive interaction between students and instructor.
Almost always - - - - - Almost never

391--The atmosphere in the classroom seemed:
Relaxed and friendly - - - - - Tense and unfriendly

392--The instructor promoted an atmosphere conducive to work and learning.
Strongly agree - - - - - Strongly disagree

401--Students were free to interrupt presentations if points needed
clarification.
Strongly agree - - - - - Strongly disagree

467--For this course rate the importance of student class participation.
Very important - - - - - Not important

Suggestions for Interpreting Collected Assessments

The information resulting from self, peer, or student review of your lesson is not easily interpretable. We recommend that you analyze your student or peer comments by looking for particular response patterns. For example, you may have a problem with your questioning ability if your students and colleagues cannot identify the purpose or goal of your questions, have trouble understanding the questions, or fail to answer questions as anticipated. Some common patterns observed when using ineffective questioning techniques are provided below. Beside each pattern are suggestions for improvement. The list is not meant to be exhaustive. Instead, it offers some practical suggestions for improvement and should stimulate your thinking of other suggestions.

Patterns	Suggestions
Answered Own Questions/No Student Response	<ol style="list-style-type: none"> 1. Allow for sufficient wait-time. 2. Call on non-volunteers; students may have become dependent upon you to provide answers. 3. Perhaps your questions are too difficult; make an effort to reword the question by breaking down the concept into smaller more manageable parts. 4. Make sure you are heard and understood by everyone.
Student Responses Consistently Incorrect, Vague or Off-Target	<ol style="list-style-type: none"> 1. Formulate questions prior to class, anticipating the range of possible student responses. 2. Be sure the wording or phrasing of the question requires responses consistent with the purpose

of the question.

3. Avoid asking multiple questions or vague "what about..." type questions.
4. Use familiar terminology when phrasing questions.

"Yes/No" or One-Word Student Response

The opening words of a question frequently determine the level and type of student response. If you want to avoid one word responses, avoid questions beginning with the following words which tend to elicit one-word responses:

are; can; do; does; have; is; would.

Interpreting or Cutting Off Student Responses

1. Listen to student responses. Demonstrate active listening skills by maintaining eye contact and reinforcing student contributions.
2. If you are going to ask questions during class, be courteous and patient enough to listen to student responses. Students may be less willing to participate in the future if they have been treated rudely.

Same Students Answering All the Time

1. Avoid depending upon the same few students to answer questions all the time. Their responses may not necessarily be representative of the larger group.
2. Tactfully thank them for their continuous contributions, and ask for other volunteers.
3. Call upon non-volunteers in a friendly non-threatening manner.

DIRECTOR'S OFFICE	Instructional Development	Measurement & Evaluation	Instructional Media	Engineering Services
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QUESTION BOX SM

In each issue of THINK, the Question Box focuses on one type of questioning strategy that can be used to enhance thinking across the curriculum.



Metacognitive Questions

"Thinking about Thinking"

by Lori Mammen

One of the most important skills for students to develop is the ability to monitor their own thought processes. Although teachers can use effective questioning strategies to help students become better thinkers, students should learn how to question themselves about their own knowledge, thinking, and problem solving. This process of "thinking about thinking" is called metacognition, and students who learn how to use and answer effective metacognitive questions reap several benefits. These benefits include opportunities to -

- develop a sensitivity and appreciation for their own thought processes
- make deliberate use of specific thinking processes to solve a problem or find an answer
- articulate and record their thinking processes
- evaluate the effectiveness of their thinking processes
- develop new thinking processes to address problems in alternate ways
- build independent thinking skills that they can carry with them into their adult life

Many students already use

metacognition or metacognitive questions, but they may not be aware that this is a legitimate, useful learning strategy. When teachers allow students to "think about their thinking" and include metacognitive questions in their teaching, they validate these students' thinking processes. As a

result, the students feel encouraged to develop their thinking skills further and share their thinking with others.

Other students make no use of metacognition or metacognitive questions. These students use a variety of strategies to obtain knowledge and solve problems,

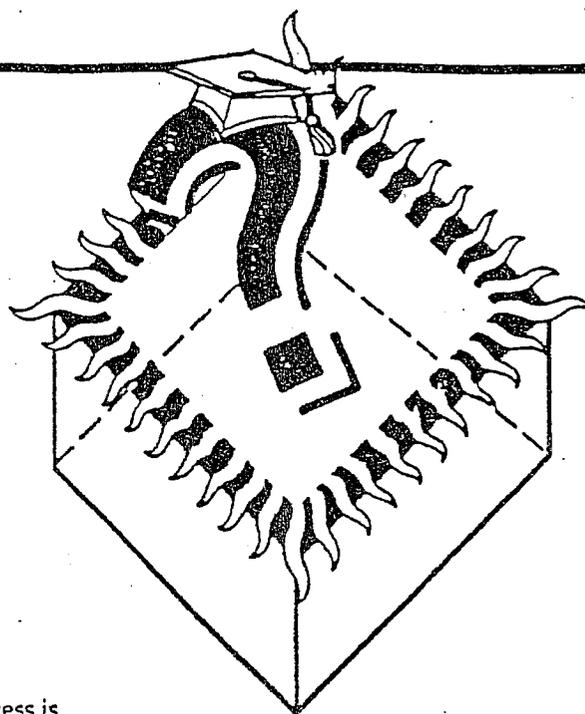
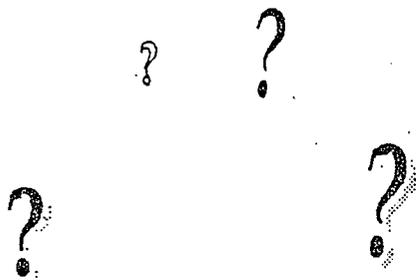
Before...

- The title of this selection makes me think about...
- Based upon the title, headings, and pictures, what is the subject of this selection?
- What do I already know about this subject?
- What would I like to know about this subject?
- What will be the main point/problem of this selection?
- Based upon the title, what are all the topics this selection could be about?
- How do I expect this material to be organized?
- How is this problem/situation like other problems/situations I have solved?
- How could I state this problem/situation in a different way?

- What other information will I need to solve this problem?
- How many different ways could I solve this problem/situation?
- How can this problem/situation be broken down into simpler steps?
- What is a reasonable estimate/prediction for this problem's answer/solution?
- Does this problem/situation seem easy or difficult to solve? Why?

During...

- What is the topic of this material?
- How is the information organized for me?
- How should I organize my



but they have not learned how to monitor their own thinking. For these students, "thinking about their thinking" is a totally new concept, and teachers need to approach it as they do other new topics. However, even students who are inexperienced in metacognition can gain immedi-

ate benefits once the process is introduced.

This month's Question Box includes several examples of metacognitive questions that can be asked in different areas of the curriculum. Teachers may use them as models for developing

appropriate questions in their particular subject area(s) and grade level(s).

Lori Mammen is associate editor of THINK.

answer/response?

- Does this selection agree/disagree with what I already know about a subject?
- What new words do I find in this material?
- How do the pictures and illustrations go with this material?
- What will be my first step in solving this problem/situation?
- Which parts of this problem/situation seem easiest/most difficult for me? Why?
- What patterns do I notice as I work on this material?
- Does this material agree with what I already know about the subject?
- Does my strategy for solving this problem/situation seem to be working?

This subject is enjoyable/not enjoyable because...

This material gives several examples of _____. Another example would be...

After...

- This selection was like/not like I thought it would be because...
- How well did my original estimate/prediction match my actual solution/answer?
- My plan/strategy worked because...
- This problem/situation would have been easier if...
- If I had to solve a similar problem/situation, I would...
- How could I use this information in my everyday life?

How would I illustrate the pattern(s) that I noticed as I worked on this material?

- ____ is like ____ because...
- I would still like to know...
- How could I summarize what I have learned?
- If I had been part of this story, I would have...
- How can I use the information I have learned in a new way?
- Where could I find more information on this subject?
- What would happen if _____ were/were not true?
- The information in this material makes me think about...
- How could I illustrate/diagram what I have learned from this material/experience?

Sarah Hickman

Social Significance Of Patterns Of Questioning In Classroom Discourse

Since the time of Socrates, the pursuit of knowledge has been characterized by the skillful use of language and patterns of questioning to examine understanding and discover truth. Some twenty-four centuries later, language remains the primary medium and discourse the primary method of teaching and learning. While language is a valuable tool for exploration of most fields of study, the prevalence of oral communication in our lives often leads teachers and students to take language for granted. Educators would benefit from a more conscious understanding of the features and functions of oral communication in the classroom. Once we are made aware of the roles of language in the classroom, we can begin to more closely examine the patterns of language use in the classroom and the effect those established patterns have on the learning process. Realizing the effect of classroom discourse patterns, particularly patterns of questioning, on the material to be learned and the learning process itself is crucial to making appropriate adjustments conducive to achieving the maximum benefits of education in a classroom environment.

Courtney B. Cazden, author of *Classroom Discourse*, asserts that "any social institution can be considered a communication system" by virtue of its very existence (2). The construction of any "institution" implies that communication is taking place between various people for a common purpose. However, the issue of understanding the elements and processes of communication within the system is especially important when discussing the function of education; as Cazden points out, "while other institutions such as hospitals serve their clients in non-linguistic ways, the basic purpose of school is achieved through communication" (2).

Cazden goes on to discuss three general features and functions of language which "make communication so central" in schools (2-3). To begin with, language transmits curriculum; despite the wealth of technological advancements available for presenting information in the classroom, spoken language remains the primary medium for providing instruction and demonstrating what has been learned. Language is used to initiate, monitor, adjust, and evaluate cognitive processes.

Secondly, language communicates control; classrooms are "crowded human environments" in which one person -- namely the teacher -- is responsible for preventing and coping with disruptions, as well as encouraging and enhancing learning processes (Cazden 2-3). While naturally occurring crowded environments are characterized by numerous "simultaneous autonomous conversations" (Cazden 2), the classroom situation relies on language rights and mores -- usually created by the institution and enforced by the teacher -- to establish and maintain social relationships.

Finally, language reflects personal identity; language is such an integral part of culture and socialization that students experience the sensation of vulnerability when asked to put themselves and their speech "on the line," so to speak, in front of peers and superiors. School is often the first place where children are expected to communicate independently (without help from parents) and publicly (in a forum where their performance or competence may be judged by outsiders). The increasing prevalence of diverse linguistic backgrounds and levels or types of cultural literacy combined in one classroom only further complicates the matter. Additionally, teachers, like students, bring personal perspectives and anxieties with them in their classroom talk. These issues of communication are brought to the forefront, as the primary way in which speakers express their identity and attitudes within the classroom setting is through language.

Linguistic communication in the classroom serves multiple functions. Teachers must make themselves aware of the language patterns in their classrooms and the

function of those patterns of discourse in the educational process. Cazden notes that "the three-part sequence of teacher initiation, student response, teacher evaluation (IRE) is the most common pattern of classroom discourse at all grade levels," and that the teacher usually initiates the interaction using question form (29). This pattern of questioning has some very powerful implications in terms of both lesson content and classroom structure. Joseph Lukinsky and Lifsa Schachter address two primary concerns in their article "Questions in Human and Classroom Discourse" about what the IRE-type structure of questioning communicates about the structure of the classroom environment: "First, it establishes a power relationship with the teacher on top. . . . second hidden lesson . . . is the reinforcement of the idea that there must be an answer to every question."

The IRE structure of discourse sets up an imbalance of power in a number of ways. Most obviously, all interactions are teacher initiated; this sends a message to the students that teachers have the right to speak at any time, while students must wait to be engaged and recognized by the teacher. Students are subordinate to the teacher in the classroom, and this is made clear by the cycle of talk which mandates that they will participate in strict accordance with the pattern established by the teacher — namely they will speak only when invited to respond to the teacher's question (Dillon 13). In addition to setting up a painfully inequitable index of speech rights, this IRE pattern communicates that the teacher decides what knowledge is valuable and at what pace the lesson should move; students are cut off from raising related issues or personal concerns or even difficulty in processing previous information because the model for language interaction focuses on teacher priorities and actions rather than making room for student needs and insights.

Despite a teachers good intentions toward checking for understanding, this pattern of questioning does little to verify if any real learning has taken place; more often than not, the question is aimed at eliciting an answer predetermined by the teacher, as opposed to a true investigation or discussion of some open ended issue. A student who can provide an acceptable answer has not necessarily mastered the learning -- he or she has merely mastered the structure (Cazden 64); often, a student has figured out what the teacher wants to hear and repeats it to further the discourse, but has not necessarily internalized the knowledge or connected the "answer" to any larger context of meaning.

This brings us to the problem of reinforcing that every question has a "correct answer" in the context of the classroom discourse. The evaluation element suggests that each answer can and will be assessed as "right" or "wrong." Because the teacher is the only individual in the classroom given the power to evaluate responses, the structure assumes that the teacher already knows the answers to the questions he or she is asking, and that the teacher is only interested in the limited scope of information which can be accounted for by the question used to initiate. This failure to make room for any in-depth exploration or additional insight communicates to the students a very "simplistic view of fields of knowledge [and] of the enterprise of study" (Lukinsky and Schachter).

The kind of learning which lends itself to IRE patterns of instruction is limited to lower cognitive level processes which stress "recall of information," and questions aimed at producing accurate recall or simple identification "do little to promote any real thinking" (Lukinsky and Schachter). Based on Bloom's taxonomy, these knowledge questions are of only minimal value, and should be supplemented by activities which engage more intermediate skills of comprehension and application, as well as the higher cognitive processes of analysis, synthesis, and evaluation (Brophy and Good). Unfortunately, the IRE model which breaks down into a search for "the answer" does not encourage students to volunteer new ideas, to connect relative experiences, to express critical viewpoints, or to take any risks which might lead to a more comprehensive understanding of the concepts being taught. Lukinsky and Schachter point out that, despite the focus on higher level questioning motivated by Norris Sanders' Classroom Questions and subsequent publications over the past thirty years, "Current research confirms that teachers still mainly ask questions at the lower level of the taxonomy."

Brophy and Good approach the problems associated with traditional patterns of

questioning in schools by suggesting a change in the content of the questions. While they assert that "it is not true that thought questions are always better than fact questions, . . . that higher-order or complex questions are not always better than lower-order or simpler questions" (371), they do recognize the need to be conscious of the construction of questions and the varying of cognitive activities. However, Brophy and Good feel that the best way to approach establishing appropriate types of questions is to shift attention away from the questioning process and toward the learning:

Issues surrounding cognitive level of questions should take care of themselves if sequences of questions are planned to accomplish worthwhile goals that are integral parts of well-designed units of instruction A good set of questions is good not merely because it contains a significant percentage of higher-level questions but also because it helps students to think about the topic systematically and emerge from the discussion with connected understandings (372-75).

If teachers establish good patterns of teaching, good patterns of questioning will develop within those patterns because the elements which distinguish effective question are often the same characteristics of effective direct instruction. These characteristics are adapted from Groisser's work in 1964: 1) clear, 2) purposeful, 3) brief, 4) natural and adapted to the level of the class, 5) sequenced, and 6) thought provoking (Brophy and Good 373). If teachers consistently present information to students in this fashion and check for understanding with a focus on the same criteria, the questioning and learning processes will be more valuable to the student than if they rely on "cognitive level" labels. While this will serve as an outline for maintaining quality content, additional adaptations must be made so that the students will have an opportunity to benefit from this superior content. Cazden suggests that perhaps the most important change is an increase in wait time for student responses (60-61).

Cazden cites research by Rowe (1974, 1986), as do Brophy and Good, that teachers typically wait one second or less for students to start a reply to their question before calling on another student or supplying information related to the question themselves (60). Interestingly, in studies where teachers were asked to incorporate longer than typical wait times, the action led to "more active participation in lessons by a larger percentage of the students" (Brophy and Good 377). Furthermore, Brophy and Good find that "subsequent research has verified that increasing wait time leads to longer and higher-quality student responses and participation by a greater number of students" (377). While this is a positive trend toward focusing on student participation and more open-ended answers, it still does not compensate for the social implications of the IRE structure in which teachers are initiating learning, students are responding to the teacher as an authority, and teachers are evaluating (rather than investigating or further encouraging) student responses.

To begin with, we need to move the focus away from teacher-centered discourse, and provide for a more equitable situation which promotes student initiation and values student knowledge. Even if the IRE paradigm had no other disadvantages, the fact that its structure prohibits student initiated questions is enough to warrant seeking alternatives. J. T. Dillon stresses the importance of student questions in *Questioning and Teaching*:

The questions arise in ignorance and perplexity, stimulating the student's thought and empowering his action in an energetic pursuit of inquiry coming to term in an answer. Question and answer conjoin to form knowledge and understanding In that way, student questions eventuate in learning (7). While the value of student initiated questions seems evident in the way it contributes to the process of student comprehension, the fact remains that students do not often ask questions in classroom situations. Dillon notes that "there is little room for their questions in normal practice, and . . . classroom discourse normatively proceeds in ways that rule out student questions" (7). This is detrimental to student participation in the educational process, not to mention their level of understanding of perplexing curriculum.

Students need to feel that the classroom is a safe environment which welcomes their inquiry and supports the entire process of learning, and not just the resulting bits of knowledge which constitute "the right answer." The imbalance of power inherent in the IRE model is not conducive to this feeling (Dillon 13-17). Also, students need to feel that their own knowledge is as valuable as the knowledge possessed by the teacher. This is not to say that students should be encouraged to perpetuate uneducated misconceptions or should be rewarded for inaccurate information; however, students must be allowed to express their ideas by initiating comments and clarify confusion by initiating questions. Also, students should not feel that they will be penalized for "the wrong answer" during the learning process, or they will never gain the confidence to actively participate in the search for gaining understanding. Besides helping students to cultivate their own inquiries and value their own knowledge, teachers have a responsibility to teach students to value each others contributions.

The IRE model focuses students on listening and responding to the teacher. Even if educators incorporate an attitude in which teachers value student input the way students value teacher instruction, we are not helping students to realize that they are rich resources of information for each other. There needs to be a shift away from teacher led interaction which forces students to listen to the teacher toward a more genuine model of inquiry and discussion in which students are active participants in their own learning and are encouraged to listen to each other. While teachers may wield a gradebook, students possess the power of peer influence -- why not take advantage of that resource in the classroom to help students focus on the learning? Brophy and Good speak of how cooperative learning discussions cause teachers to adopt a different role from the one they play in IRE structured questioning but can bring greater levels of participation and understanding to the class (79-81).

Educators who use cooperative learning practices in addition to direct instruction stress to students that listening and responding to each other requires the same respect and interest as listening and responding to teachers. However, what about the way teachers react to their students? Traditional teacher reaction to students participation is evaluative -- positive, negative, or indifferent -- but is that really affording students the respect they deserve? A trend in replacing evaluative comments which judge with responsive comments which respect is necessary to establish more effective patterns of discourse. Students should feel that their input is interesting or important or related or novel -- not merely right or wrong. The IRE model does not lend itself to this type of response, but the classroom discussion model does. It is important to validate the act of input, not just the information which is shared. Students need to know that effective participation is as valid a success as "getting the right answer" in order for students to remain motivated to participate. Interestingly enough, this is understood in perpetuating worthwhile social interaction but often forgotten when trying to effect productive classroom discourse.

Cazden asserts that "one of the most important influences on all talk . . . is the participants themselves -- their expectations about interactions and their perceptions of each other" (67). Participants in classroom discourse are no exception. Perhaps rather than focusing on the communication system of the social institution of education, teachers should be focusing on the social implications of the communication structure of education. The communication structure of a classroom is based on the need to communicate curriculum, in a controlled situation, between people of separate and culturally specific identities. Accordingly, the structure of communication is as socially and educationally relevant as the language itself in a contemporary classroom. Effective teachers must become aware of the social significance which is built into the construction of communication patterns in order to choose patterns of discourse which are best suited to the needs of the people in their classrooms.

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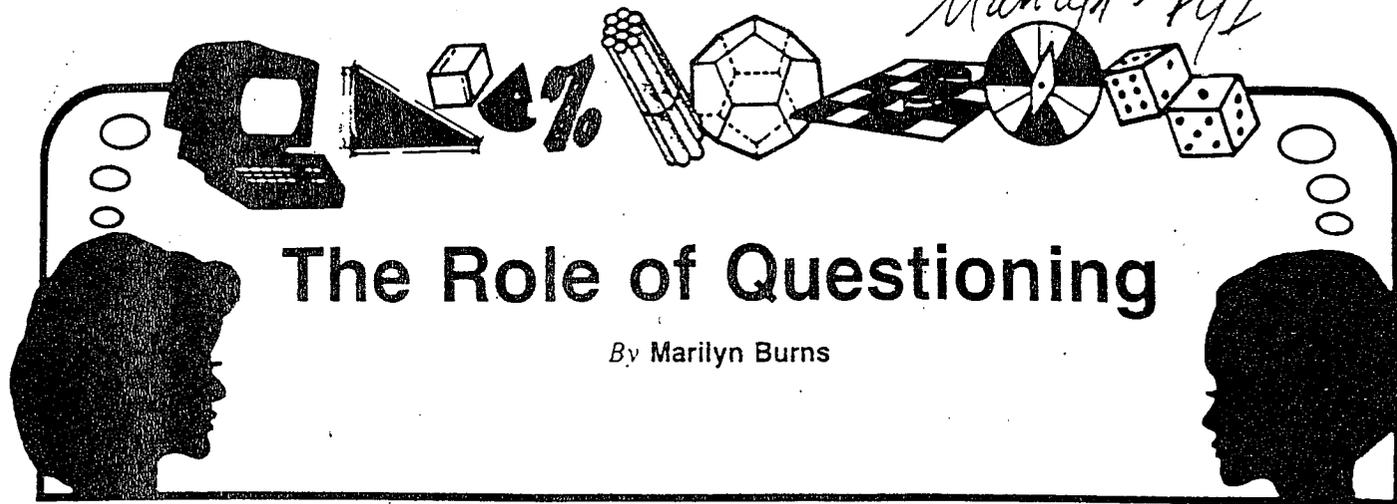
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Marilyn - FYI



The Role of Questioning

By Marilyn Burns

A third-grade teacher was beginning a class lesson in which the children were to work in pairs. When assembling the supplies for each pair of children, the teacher raised the question, "How many pairs of children will we have?" None of the students had a ready answer, nor did they seem to know immediately a way to proceed to get an answer. The teacher asked another question, "What do you need to know to figure this out?" One student suggested that they needed to know how many students there were. The teacher questioned further, "How can we find this out?" The children suggested different ways—having the students count off, counting by rows, or having each student in the class stand or sit down when counted.

After some discussion, when children were engaged in thinking about the problem, the teacher had them work in small groups to figure out how many pairs of students there actually were. When the children's attention was brought back to the total group, the teacher asked for their answers, continuing to prod a bit more: "How did you figure that out? Who did it another way? Maria got another answer; can you convince her that yours is right? If everyone were present today, then how many pairs would we have?"

That the teacher seized this opportunity for a problem-solving experience is certainly a bonus for the children's mathematical learning. Involving students in real situations is always a plus for mathematics instruction. But more than that, the types of questions the teacher was asking the students to consider were helping to create a classroom atmosphere truly conducive to developing mathematical thinking abilities. Children were asked to consider questions for which answers were not immediately obvious. They were given the opportunity to connect what they did know to what they needed to examine. They were asked to reflect on their thinking. It's just this kind of skill with questioning that is needed to pave the way for teaching children to think mathematically.

Elementary school mathematics instruction has traditionally been geared toward developing arithmetic proficiency. Students spend the bulk of their mathematics instructional time learning arithmetic procedures and practicing them on worksheets or pages of arithmetic exercises in textbooks. Word problems are the usual vehicle for applying these skills, presenting situations for students to translate into arithmetic sentences and then to do the computation needed.

In traditional instruction, the primary goal is to develop computational competence. The emphasis is often on getting right answers, enough right answers to earn good grades or to do well on standardized tests. The teacher or the answer key is the source for revealing to the students the correct-

ness of their answers. And, sadly, it's the quick right answer that is often valued more than the thinking that leads to that answer. What is missing is attention to children's deciding on the reasonableness of their solutions, justifying their procedures, verbalizing their processes, reflecting on their thinking—all those behaviors that contribute to the development of mathematical thinking.

Understanding arithmetic is important for children. However, it is essential that the development of arithmetic understanding be embedded in the context of helping children become powerful mathematical thinkers, able to solve problems, see relationships and patterns, and use numbers confidently to come to decisions. Children need to feel mathematically secure, to enjoy mathematical explorations, to be challenged and stimulated by, and interested in, mathematics. The teacher is the key to making these things happen.

The Teacher's Role

The questions teachers ask deserve careful attention. Students should be encouraged to make conjectures and to examine the validity of their thoughts. They need to search for convincing arguments that support their conjectures or that show discrepancies in others' thinking. They should be flexible enough to consider other approaches and willing to change their position if new light is thrown on the situation. Questions that promote this kind of thinking are of the following types:

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