### Changing College Classrooms

#### Exhibit 2.1. Guiding Thought-Provoking Questioning.

<table>
<thead>
<tr>
<th>Generic Questions</th>
<th>Specific Thinking Skills Induced</th>
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<tr>
<td>What is a new example of . . . ?</td>
<td>Application</td>
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<td>How could . . . be used to . . . ?</td>
<td>Application</td>
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<td>What would happen if . . . ?</td>
<td>Prediction/hypothesizing</td>
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<td>What are the implications of . . . ?</td>
<td>Analysis/inference</td>
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<td>What are the strengths and weaknesses of . . . ?</td>
<td>Analysis/inference</td>
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<td>What is . . . analogous to?</td>
<td>Identification and creation of analogies and metaphors</td>
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<td>What do we already know about . . . ?</td>
<td>Activation of prior knowledge</td>
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<tr>
<td>How does . . . affect . . . ?</td>
<td>Analysis of relationship (cause-effect)</td>
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<td>How does . . . tie in with what we learned before?</td>
<td>Activation of prior knowledge</td>
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<td>Explain why . . .</td>
<td>Analysis</td>
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<td>Explain how . . .</td>
<td>Analysis</td>
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<td>What is the meaning of . . . ?</td>
<td>Analysis</td>
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<tr>
<td>Why is . . . important?</td>
<td>Analysis of significance</td>
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<td>What is the difference between . . . and . . . ?</td>
<td>Comparison-contrasts</td>
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<td>How are . . . and . . . similar?</td>
<td>Comparison-contrasts</td>
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<tr>
<td>How does . . . apply to everyday life?</td>
<td>Application-to the real world</td>
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<tr>
<td>What is the counterargument for . . . ?</td>
<td>Rebuttal argument</td>
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<td>What is the best . . . , and why?</td>
<td>Evaluation and provision of evidence</td>
</tr>
<tr>
<td>What are some possible solutions to the problem of . . . ?</td>
<td>Synthesis of ideas</td>
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<tr>
<td>Compare . . . and . . . with regard to . . .</td>
<td>Comparison-contrasts</td>
</tr>
<tr>
<td>What do you think causes . . . ?</td>
<td>Analysis of relationship (cause-effect)</td>
</tr>
<tr>
<td>Why?</td>
<td>Evaluation and provision of evidence</td>
</tr>
<tr>
<td>Do you agree or disagree with this statement: . . . ? What evidence is there to support your answer?</td>
<td></td>
</tr>
<tr>
<td>How do you think . . . would see the issue of . . . ?</td>
<td>Taking other perspectives</td>
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</tbody>
</table>
Questioning Processes

Questioning processes (Dantonio, 1990) are derived from the work of Taba (1971) and Ehrenberg and Ehrenberg (1978). They include ten thinking processes grouped into four categories:

1. Gathering: observing and recalling
2. Sorting: comparing, contrasting, and grouping
3. Organizing: labeling, classifying, and sequencing
4. Interpreting: inferring (causes, effects, qualities) and predicting

I am particularly partial to this system because, in my opinion, it already categorizes the various purposes that the instructor might have for asking questions. All the instructor has to do, then, is to select questions from the category that most closely meets the identified instructional objective. Sample questions based on the model of questioning processes are provided in Exhibit 6.3.

Types of Interactions

In addition to the questions themselves, instructors need to be cognizant of the interaction and response patterns that occur in their classrooms. As instructors, we desire to give each student an equal opportunity to respond to questions. Research has shown, however, that we are not equitable in our questioning practices. We tend to call on students whom we perceive to be “high achievers” more often than we call on students whom we perceive to be “low achievers.” Males get more response opportunities than females. Students sitting in the front rows get recognized and called on more frequently than students who sit in the back of the classroom (Brophy and Good, 1986).

These tendencies underline the need for us to pay attention to classroom dynamics. One way to counteract inequitable interaction patterns is to plan for them directly and not rely on the chance interaction patterns of students who raise hands.
Questioning Techniques for the Classroom

Exhibit 6.2. Using Ascher-Gallagher's Classifications:
Examples of Open-Ended Questions for Use Across Disciplines.

Memory
Arrange the __________ in the correct sequence.
List all of the __________ that you can recall.
Identify the reasons the author gives for __________.

Convergent Thinking
Based on the information in the text, which solution would be considered the most appropriate?
Analyze this example and tell me the governing principle.

Divergent Thinking
Quantity model: List all of the __________.
How many ways can you come up with __________?

Viewpoint model: How would this look to a __________?
What would __________ mean from the viewpoint of __________?

Involvement model: How would you feel if you were __________?
You are a __________. Describe how you feel.

Conscious self-deci model: You have been given the power to __________. How will you use it?
Suppose you were __________. How would you solve __________?

Forced association model: How is __________ like __________?
Get ideas from __________ to improve __________.
I only know about __________. Explain __________ to me.

Rereorganization model: What would happen if __________ were true?
Suppose __________ happened, what would be the consequences?

Evaluation
Decide which proposal is the best.
Prioritize the ideas from most important to least important.
Assess the effectiveness of the solution presented by other groups.

Exhibit 6.3. Using a Questioning Process Taxonomy:
Examples of Open-Ended Questions for Use Across Disciplines.

Observing
What do you notice about __________?
What do you observe about __________?

Recalling
What do you recall about __________?
Tell me what you remember concerning __________?
Based on your reading, what did you find out about __________?

Comparing
How are __________ and __________ alike?
Compare __________ and __________.
Who (what) is similar to __________?

Contrasting
What are the differences between __________ and __________?
Tell me what discrepancy you noted concerning __________ and __________.

Grouping
How can we group these items?
Based on your reading, which of these could be grouped together because they are alike in some way?

Labeling
What are some appropriate names for this idea?
What terms can you think of to communicate the critical characteristics of this concept?

Classifying
Is this __________ an example of __________ (category)?
Which of the examples belongs in the __________ (label) group?
Find or create an example of __________ (concept label).

Sequencing
Rank the items from __________ (criterion) to __________ (criterion).
Place the following information in __________ (criterion) order.
What do you think is the first significant piece of information in this chapter?
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**Inferring**
What are some causes of _________?
What are some effects of _________?
What do you think is true about _________?

**Predicting**
What do you think will solve the problem of _________?
What do you think will happen next in this situation?
What do you think will happen as a result of _________?

to be recognized. A number of strategies are available for guiding student responses.

**Paired Responses**

For many instructors, paired response techniques are the easiest to use, for they require no advance preparation. Instead of the instructor calling on a single student to answer a question, students respond to another student first, then responses are shared with the entire class. Using this slight alteration of the traditional single-student interaction pattern ensures that all students respond to all questions. Exhibit 6.4 presents a description of three paired response interactions.

**Small-Group Interactions**

Small-group (three, four, or five students) interactions may require more planning time for the instructor and more actual class time for the activity, but the payoff is increased student-to-student interest and motivation. You will recognize the links between posing questions to small groups and the types of collaborative learning activities that were discussed in Chapter Five by Cooper, Robinson, and McKinney. Several small-group strategies are outlined in Exhibit 6.5.

Questioning Techniques for the Classroom

Exhibit 6.4. Paired Response Interactions.

**Name of Strategy:** Turn to Your Partner And . . . (Weaver and Cotrell, 1986)

**Procedure:** This is an informal technique to use throughout a lecture. Tell students to identify a "partner" sitting in close proximity. Lecture as usual, but pause every five or ten minutes and direct partners to discuss various points of lecture. You may occasionally ask partners to share their ideas with the whole class.

**Uses:** This technique is best used with simple recall of factual information or to better understand the lecture.

**Name of Strategy:** Paired Partners: Think Aloud (Whimbey and Whimbey, 1975)

**Procedure:** This is used as a problem-solving strategy. Pair students and have them react to a point made in the lecture or in a reading. One partner thinks out loud while the other monitors with cues and questions. Then the partners reverse roles. Students share experience either in writing or in class discussion.

**Uses:** This approach is best used with material that requires students to clarify information and understand it from a personal perspective.

**Name of Strategy:** Think/Pair/Share (Lyman and McTighe, 1988)

**Procedure:** To maximize critical thinking and reflection, ask students a question and then have them pause and think. Use wait-time (approximately five seconds), then direct students to share their thoughts with one another.

**Uses:** This strategy is best used for information that requires judgment or evaluation.

**Whole-Class Techniques**

An instructor who desires to direct questions to the entire group can draw from several strategies that assist in gaining the attention and interest of all the students. Three such strategies are presented in Exhibit 6.6.

**General Questioning Strategies to Enhance Student Responses**

Perez and Strickland (1986) give the following suggestions to assist instructors in any discipline to have meaningful classroom discussions:
Exhibit 6.5. Small-Group Interactions.

Name of Strategy: Triads (Costa, 1986)

Procedure: Group students in threes and give them a task to complete or a question to answer. Including a third person adds more ideas to the discussion but still maintains a small-group feeling, where students feel safe in expressing their opinions.

Uses: Many instructors find triads the ideal group size for discussing textbook chapters. More students tend to read the textbook if they know they will be responsible to a small group of their peers for the content. It is difficult for a student to "hide" in a group of three. Many instructors find success in keeping the "textbook discussion team" together for the entire term in order to build trust and continuity.

Name of Strategy: 2-4-8: Tell/Retell (Fogarty and Opeka, 1988)

Procedure: Pair students and ask them a question. Then have the pairs form groups of eight, where the question is again discussed.

Uses: This is an ideal icebreaker to encourage sharing of personal information or personal reactions to the course material. Students enjoy this technique, and it encourages sharing with other classmates with whom they might not otherwise interact.

Name of Strategy: Jigsaw (Aronson, 1978)

Procedure: Assign students to groups of four to six. Divide the content to be studied and assign each student a segment to teach the other students (like a jigsaw puzzle, with each student having an essential piece). Each group of students is teaching the same content. At times you may regroup students to meet in "expert" groups of individuals who have been assigned the same topic. Expert groups allow students to gain clarity on their particular topic before they individually present it to their group.

Uses: This is a beautifully crafted teaching technique for gaining students' complete engagement in a subject, a point that was noted in Chapter Five by Cooper, Robinson, and McKinney. Most questions become student-to-student interactions, with the instructor sitting in on the various jigsaw groups to listen and to further clarify difficult content. Many instructors try this out for the first time by dividing up a chapter in a textbook into five equal parts and then assigning students to one of the five parts. Again, all teaching is accomplished by students within their small group. They do not give a whole-class presentation.

Name of Strategy: Group Investigation (Sharan and Sharan, 1976)

Procedure: Lead the class in brainstorming a list of provocative questions that pertain to the course and that they would like to investigate. Have students sign up in teams of four to six to investigate the answers. Give students class time to organize and to make decisions pertaining to the investigation (who is going to do what). In subsequent sessions, give groups some class time to communicate with each other. Set dates for groups to present their findings to the whole class.

Uses: This strategy uses the students' own curiosity about the course content. Questions are initiated by students, investigated by students, and presented by students. The instructor provides guidance, resources, and class time. The group investigation runs parallel to the instructor's teaching of the course.

Exhibit 6.6. Whole-Class Techniques.

Name of Strategy: Total Group Response (Fogarty and Bellanca, 1987)

Procedure: Have students respond to questions by standing (or sitting) in particular areas of the room. (Another version of this strategy is for students to form a "human graph" based on a question that the instructor poses.)

Uses: This is an especially effective strategy for opinion and evaluative questions. For example, you may inquire which of several economic policies the federal government should enact. Students then stand in a particular place in the classroom if they favor one policy and stand in another spot if they favor a different policy. Students may then confer with classmates who are standing with them and together construct a rationale for their opinion to share with the entire class.

Name of Strategy: Forced Response

Procedure: Have students sitting in a semicircle or circle each respond to a question you pose. Students are allowed to "pass" if they do not wish to respond. When the question has gone all around the circle, initiate "cross-talk," in which any individual may direct a comment or question to any other individual (or to the entire group). All students listen to each interchange and decide whether to make a contribution. When the conversation halts, you may pose a new question and begin the circle response again.

Uses: Students seem to enjoy this strategy because everyone is given equal status and is allowed to give his or her opinion on the topic. The "pass" option allows for individual safety in the group. This approach is also an effective means for developing class unity and cohesion because all students face each other in the seating arrangement and are allowed to hear all individual points of view on a topic.