Questioning the Lecture Format

by Barbara J. Limbach and Wendy L. Waugh

Lectures often emphasize rote learning rather than critical thinking. Topics are discussed sequentially, not critically. The teacher does the talking and most of the thinking.[1] The student memorizes material and is placed in a passive role. But many of us who use the lecture should also be concerned that our students learn to think critically.

One way to increase the emphasis on critical thinking while using a lecture format is to ask questions. Questioning can stimulate interaction between teacher and learner and challenge the learner to defend his or her position. In other words, the student must think critically. Clasen and Bonk posit that, although there are many strategies that can impact student thinking, teacher questions have the greatest impact. They find that the level of student thinking is directly proportional to the level of questions asked.[2] Although most teachers believe the development of critical thinking in their students is extremely important, few know what it is, how it should be taught, or how it should be assessed.[3]

WHAT IS CRITICAL THINKING?

Critical thinking can be traced to the Socratic method, dating back more than 2,000 years. The theory of critical thinking began to be systematized with the

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works of Benjamin Bloom in the mid-20th century. Bloom headed a group of educational psychologists who developed a classification of intellectual behaviors important in learning and a taxonomy that includes three overlapping domains: cognitive, psychomotor, and affective. Bloom continued to expand upon these ideas for nearly two decades. His ideas are now broadly accepted and taught in teacher education programs throughout the U.S.

He identified six levels within the cognitive domain, each related to a higher level of cognitive ability:[4]

- *Knowledge* focuses on remembering and reciting information.
- *Comprehension* focuses on relating and organizing information previously learned.
- *Application* focuses on applying information according to a rule or principle in a specific situation.
- *Analysis* is defined as critical thinking focused on parts and their functionality in the whole.
- *Synthesis* is defined as critical thinking focused on putting parts together to form a new and original whole.
- *Evaluation* is defined as critical thinking focused upon valuing and making judgments based upon information.

In 1956, Bloom found that 95 percent of test questions college and university students encountered required thinking only at the lowest level: the recall of information.

Critical thinking takes place when students perform in the analysis through evaluation levels. Table 1 shows Bloom's six levels of educational objectives and provides verbs and responses that teachers can use in developing questions and creating appropriate assessments at each level. Gagne outlined the events of learning that can take a student from the knowledge level to critical thinking.[5]

First is the motivation phase. Here, the learner expects that a need will be met or a curiosity satisfied. Second is the apprehending phase, where the learner pays attention and focuses on the task. Third is the acquisition phase where the learner forms cognitive associations and integrates the new information. Fourth is the retention phase. The learner now files the new information into long-term memory through rehearsal, practice, or recitation.

Fifth is the recall phase, when the learner links the new information to other concepts to accommodate recall. Sixth is the generalization phase. The learner applies the information outside the classroom, and circumstances are presented for the learner to use the new information in a relevant way. Seventh is the performance phase, where learners demonstrate their mastery of new information. Eighth is the feedback phase. In this final phase, learners receive corrective feedback on

Table 1
Bloom's Taxonomy of the Cognitive Domain

Bloom's Six Levels of Educational Objectives	Behavioral Verbs Representing Intellectual Activity	Appropriate Behavioral Responses
Knowledge	Who, what, when, where, define, describe, memorize, label, list, recognize, name, repeat, draw, state, identify, select, write, locate, recite	Requires an answer that demonstrates simple recall of facts.
Comprehension	Summarize, restate, paraphrase, illustrate, match, explain, defend, relate, infer, compare, contrast, generalize, clarify, show, review, tell	Requires an answer that demonstrates an understanding of the information.
Application	Apply, change, put together, construct, discover, produce, make, report, sketch, solve, show, collect, prepare, interpret, relate, design	Requires an answer that demonstrates an ability to use information, concepts and theories in new situations.
Analysis	Examine, classify, categorize, research, contrast, compare, disassemble, differentiate, separate, investigate, subdivide, diagram, analyze, conclude	Requires an answer that demonstrates an ability to see patterns and classify information, concepts and theories into component parts.
Synthesis	Combine, hypothesize, construct, originate, create, design, formulate, role play, develop, suppose, organize, compile, compose, generate	Requires an answer that demonstrates an ability to relate knowledge from several areas to create new or original work.
Evaluation	Compare, recommend, assess, value, apprise, solve, criticize, weigh, consider, debate, defend, conclude, predict, evaluate	Requires an answer that demonstrates an ability to judge evidence based on reasoned argument.

their demonstrations of mastery.

If learners are to participate in critical thinking, they must pose arguments, state opinions, look for evidence, critique the evidence, and think with fair-mindedness. According to Ferrett, attributes exhibited by critical thinkers include:

- Asks pertinent questions

- Assesses statements and arguments
- Admits to a lack of understanding or information
- Has a sense of curiosity
- Seeks new solutions
- Defines a set of criteria for analyzing ideas
- Examines beliefs, assumptions, and opinions and weigh them against facts
- Listens carefully to others and is able to give feedback
- Sees that critical thinking is a lifelong process of self-assessment
- Suspends judgment until all facts have been gathered and considered
- Looks for evidence to support assumption and beliefs
- Adjusts opinions when new facts are found
- Looks for proof
- Examines problems closely
- Rejects information that is incorrect or irrelevant[6]

Students require varying amounts of experience at the lower levels of the taxonomy prior to engaging in critical thinking and acting at Bloom's analysis, synthesis, and evaluation levels. It is, therefore, important that teachers identify the background knowledge that students must have to make sense of what they will be discussing. Following are examples of questions in each of the six levels of Bloom's taxonomy. Notice the progression of learning and increasing complexity of the questions. Assume the concept being taught is leadership.

- Knowledge: What is the definition of leadership? List five characteristics of a good leader.
- Comprehension: Describe leadership in your own words. Describe the importance of each of the characteristics of a good leader.
- Application: Why is leadership significant? Considering the characteristics of good leaders, choose three leaders that possess these qualities.
- Analysis: Distinguish the difference between leadership and teamwork. Compare the qualities of a good leader with the qualities of a poor leader.
- Synthesis: How would you select the best leader for a group whose charge is to beautify America? Write a job description that would attract the best candidates for a leader in the retail industry.
- Evaluation: What is the most important quality of a good leader and why? What additional qualities would you use to assess good leadership?

To make critical thinking happen, your teaching objectives, activities, and assessments should be tied to higher-level behavioral verbs (see table 1). A well-written lesson plan should target a behavior verb, introduce and practice the

desired behavior, and end with the learner exhibiting the behavioral response. Well-written questions accelerate a learner's movement into critical thinking.

Building critical thinking into one's pedagogy makes for a more meaningful teaching and learning process. It encourages teachers to recognize student knowledge and experience as a valuable element of education. This may require teachers to adapt their methods, content, and approaches, to the context in which they work and to the ways in which students experience learning.[7] Also keep in mind that courses must be meaningful. Kindsvatter, Wilen, and Ishler determined that

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learning consistently takes place when critical thinking is combined with personal relevance to the student.[8] In order for ideas to really take hold, it is important for students to find personal meaning in the curriculum.

Questioning allows the teacher to establish what is already known and then to expand that knowledge to develop new ideas and understanding. Questions can be categorized in a number of different ways. One simple method is to use the general categories of convergent and divergent questions. Convergent questions seek one answer or a more specific answer; divergent questions seek a variety of correct answers. Convergent questions apply to Bloom's knowledge, comprehension, and application levels, while divergent questions apply to his analysis, synthesis, and evaluation levels. Divergent questions are generally open-ended and foster student-centered discussion and thereby encourage critical thinking. When instructors plan, they must consider the purpose of the question and then develop the appropriate level and type of question to accomplish the purpose. All students need experience with higher level questioning once they become familiar with a concept. Thoughtful preparation on the part of the teacher is essential in providing that experience.

To become skilled questioners, teachers must make the shift from lecturer to facilitator. This is understandably difficult and takes commitment. According to the Educational Technology Centre at the University of Sydney,[9] skilled questioners have certain characteristics. They are brief and concise; are prepared to rephrase questions; are able to draw further responses from participants; use a variety of

techniques; redirect questions/responses; provide feedback and reinforcement without repeating answers; and spread questions around the class.

There are a number of techniques that teachers can use to improve their questioning skills. Consider giving up one-at-a-time questioning in exchange for a group discussion. This is important because any student not directly engaged in the discussion will have a tendency to disengage. You also must make the difficult shift from dominating the discussion to facilitating it. The role of a discussion leader is different from the role of lecturer. Your role as facilitator is to guide students into discussion, foster understanding, and stimulate intellectual growth. Many problems can be avoided by being thoughtful when interacting with students; always be supportive, encouraging, and respectful.

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Deal with the following types of students as quickly as possible so that one or two problem students do not create a problem class.

The Shy Student—Make sure everyone in class knows each other by name, creating a safe environment. Ask the shy student questions that will boost his or her confidence and always make eye contact. Small group activities and writing down responses before discussion can be very useful. If the shyness persists, talk with the student privately. You might encourage the student to participate by explaining it is an important part of the course.

The Lazy Student—All students should be held to the same standards, if a student misses class, is persistently late, or fails to hand in assignments, you must meet with them. If the student needs more help, suggest a tutor. If the student's course load is too heavy, suggest a meeting with their academic advisor.

The Talkative Student—Try to elicit responses from other students first, then have the talkative student summarize the responses of others. This allows others to be take part but honors the talkative student's need to be involved. You may also ask others to answer the questions of the over-talkative student. It might become necessary to explain to the talkative student in private that the floor belongs to everyone.

The Student Who Challenges You—Always use evidence when disagreeing

with a student. Never begin your statements with "I" and always correlate comments to the material. If the behavior is disruptive to the learning environment, offer to talk to them privately after class. Do not avoid these students in the hope that they will correct themselves.

There are different discussion models. You should use one that you're comfortable with and that works best for your discipline. The focused-discussion model—where specific answers are sought—is good for the natural sciences and engineering. It allows the teacher to cover larger amounts of material, to separate the major

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from the minor concepts, and to place more emphasis on review, clarification, and elaboration of the lecture and course readings. The open-discussion model—where more than one answer may be appropriate—works well for the social sciences and humanities because there is seldom one correct answer or approach. In this setting, a less structured and less directed discussion format usually works best. Most fields of study, however, benefit from a combination of both techniques.

Continually refine the art of questioning. There are many different types of questions, and good questions are the key to inspiring critical thinking. The most productive questions will elicit a variety of responses, inviting students to think about and respond at a higher level. You should also guide the students to the answers or refer them to a resource that will provide further explanation. Doing this allows the student to develop the analytical tools needed to search for answers. In that same vein, when a student asks a question, the teacher should redirect the question to the class to encourage thinking and problem solving. The instructor can rephrase the question, guide the class toward the correct answer, or use the question to introduce a related topic.

Finally, all learners should have the opportunity to interact with the teacher and with each other. Instructors should allow time in their course for debate. In this way, learners will come to see themselves as risk-takers who exercise control over their own learning, and will experience success when they apply what they have learned.

Elder and Paul proposed that the art of questioning is essential to the art of

learning, "Solely to the extent that students ask genuine questions and seek answers to them are students taking content seriously."[10] Be it math, history, or business, students learn by asking questions related to their specific subject.

Students learn best in a supportive environment. Building a class community that emphasizes important concepts and builds background knowledge happens only in a comfortable classroom environment. Critical thinking in the classroom requires interpersonal relationships that support the participation of all. To

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improve participation, avoid the typical classroom pattern of a few talkers and many listeners. Cohen emphasized that communication discomfort in the classroom is a multicultural issue. Nontraditional college students, which include at-risk students and women, are less involved in classroom interaction.[11] Instructors may believe in the importance of gender and racial equity, yet are not supportive enough when faced with diversity in their own classrooms.

To reduce communication discomfort, begin each course by telling the students that they are all expected to participate. Call on each student by name and, as the situation becomes less threatening, call on students who do not raise their hands. Monitor carefully the selection of speakers and try to call on all students equitably. Pause after asking a question, allowing students to process their thoughts. Coach the more reluctant students with follow-up questions such as, "Tell me more" or "Can you give an example?"

Watch for nonverbal clues that a student has something to say and encourage that student to say it. Offer praise when a student deserves it. Keep a teaching diary that notes which students are contributing, then encourage those who are not. Monitor your voice for impatience and dismissal, and don't interrupt. Use the same tone of voice with all students. Avoid the generic "he" or "mankind" in favor of "he or she" or alternate male and female references. Cue student responses by saying, "There is no right answer" or "What other alternatives exist?"

Monitor your examples to vary cultural references, eliminating those that might be alien to some students. Encourage your diverse class members to help in providing examples. Finally, when participation is low, stop the full-group discus-

sion and ask students to write their answers to the question. Or ask a question at the end of class for students to come prepared to answer next class, thus allowing students to devote more time to thinking through their responses.[12]

Teachers must be aware of the importance of critical thinking in the learning process. If teachers are to effectively teach students to think critically, they must devote significant time to developing a clear concept of critical thinking themselves. This takes thoughtful preparation of teaching objectives. Critical thinking is encouraged by questioning techniques that use both convergent questions, which encourage thinking at the lower levels of Bloom's taxonomy, and divergent questions, which encourage the student to perform at the analysis, synthesis, and evaluation levels, especially when used in a comfortable classroom setting.

Critical thinking is characterized by a readiness to question all assumptions, an ability to recognize when it is necessary to question, and an ability to evaluate and analyze.[13] Critical thinking has been widely recognized and encouraged in education for many years, and using questioning techniques is one way that instructors can inspire critical thinking. In fact, effective application of the questioning method to promote critical thinking may be the answer to successful teaching and student learning.

ENDNOTES

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