How to Study and Learn (Part Four)

In the previous three articles we focused on ideas for helping students improve their studying and learning habits. All of the recommendations come from our *Thinker's Guide to How to Study & Learn.* This guide is designed to help students think deeply through content and begin to take their learning seriously. In this article, the final in its series, we focus on the importance of questioning in learning, providing suggestions to help students become active questioners. We also introduce students to the idea that some disciplines deal largely, if not exclusively, with definitive questions, while others deal largely with debatable questions. As with the previous three columns, each of the sections below is written in the form of directions for students. Thus, you should read what follows as if you were a student considering how you can improve your learning. Of course, we assume that students will probably need help from their teachers in understanding how to take ownership of each of the essential ideas below. Only a rare student will be able to immediately implement the recommendations without some guidance and facilitation

How to Understand
The Role of Questions in Thinking & Learning

Thinking is not driven by answers but by questions. Had no questions been asked by those who laid the foundation for a field--for example, Physics or Biology — the field would never have been developed in the first place. Furthermore, every field stays alive only to the degree that fresh questions are generated and taken seriously as the driving force in thinking. To think through or rethink anything, one must ask questions that stimulate thought. Questions define tasks, express problems and delineate issues. Answers on the other hand, often signal a full stop in thought. Only when an answer generates a further question does thought continue its life. This is why you are thinking and learning only when you have questions.

So, instead of trying to store a lot of disconnected information in your mind, start asking questions about the content. Deep questions drive thought beneath the surface of things, forcing you to deal with complexities. Questions of purpose force you to define tasks. Questions of information force you to look at your sources of information as well as assess the quality of information. Questions of interpretation force you to examine how you are organizing or giving meaning to information. Questions of assumption force you to examine what you are taking for granted. Questions of implication force you to follow out where your thinking is going. Questions of point of view force you to examine your perspective and to consider other relevant viewpoints.

Questions of relevance force you to discriminate what does and does not bear on a question. Questions of accuracy force you to evaluate and test for truth and correctness. Questions of precision force you to give details and be specific. Questions of consistency force you to examine your thinking for contradictions. Questions of logic

force you to consider how you are putting the whole of your thought together, to make sure that it all adds up and makes sense within a reasonable system of some kind.

Continually remind yourself that learning begins only when questions are asked.

Essential Idea: If you want to learn, you must ask questions that lead to further questions that lead to further questions. To learn well is to question well. How To Raise Important Questions Within A Subject

Every discipline is best known by the questions it generates and the way it goes about settling those questions. To think well within a discipline, you must be able to raise and answer important questions within it. At the beginning of a semester of study, try generating at least 25 questions that each discipline you are studying seeks to answer. To do this you might read an introductory chapter from the textbook or an encyclopedia entry on the topic. Then explain the significance of the questions to another person.

Then add new questions to the list (as your courses proceed) underlining questions when you are confident you can explain how answer them. Regularly translate chapter and section titles from your textbooks into questions. For example, a section on photosynthesis answers the question: What is photosynthesis?

In addition, look for key questions in classroom lectures. Relate basic questions to the theory the discipline uses to solve problems. Master fundamental questions well. Do not move on until you understand them.

Notice the interrelationship between key ideas and key questions. Without the ideas the questions are meaningless. Without the questions, the ideas are inert. There is nothing you can do with them. A skilled thinker is able to take questions apart, generate alternative meanings, distinguish leading from subordinate questions, and grasp the tasks that questions demand of us.

Essential Idea: If you become a good questioner within a discipline, you will learn the essential content of the discipline.

How to Distinguish One-System From Competing-System Disciplines

In some disciplines, the experts rarely disagree; in others, disagreement is common. The reason for this is found in the kinds of questions they ask and the nature of what they study. Mathematics and the physical and biological sciences fall into the first category. Thinkers within these disciplines study phenomena that behave consistently under predictable conditions. They also pose questions that can be expressed clearly and precisely, with virtually complete expert agreement. The disciplines dealing with humans, in contrast — all the social disciplines, the Arts, and the Humanities — fall into the second category. What they study is often unpredictably variable.

For example, humans are born into a culture at some point in time in some place. They are raised by parents with particular beliefs. And they form a variety of associations with other humans who are equally variously influenced. What is dominant in our behavior varies from person to person. Hence, many of the questions asked in the disciplines dealing with human nature are subject to disagreement among experts (who approach the questions from different points of view). Consider the varieties of ways that human minds are influenced:

- sociologically (our minds are influenced by the social groups to which we belong)
- philosophically (our minds are influenced by our personal philosophy)
- ethically (our minds are influenced by our ethical character)
- intellectually (our minds are influenced by the ideas we hold, by the manner in which we reason and deal with abstractions)
- anthropologically (our minds are influenced by cultural practices, mores, and taboos)
- ideologically and politically (our minds are influenced by the structure of power and its use by interest groups around us)
- economically (our minds are influenced by the economic conditions under which we live)
- historically (our minds are influenced by our history and by the way we tell our history)
- biologically (our minds are influenced by our biology and neurology)
- theologically (our minds are influenced by our religious beliefs)
- psychologically (our minds are influenced by our personality and egocentric tendencies)

What is more, humans are capable of discovering how they are being influenced in these ways, may reflect on them, and then act to change their behavior in any number of ways. For example, consider how much more difficult it would be to study the behavior of mice if each mouse varied in its behavior from every other mouse depending on experience, personal philosophy, and culture. Or, consider how difficult it would be to study the behavior of mice if the mice could discover we were studying them and begin to react to our study in the light of that knowledge. And what if those mice then decided to study us studying them? In other words, the goal of studying human behavior faces enormous difficulties.

In studying a “one system” subject, in contrast, the task is to learn how to think within one overriding point of view. Learning to think algebraically, for example, does not require that you consider schools of thought within algebra. Algebraic thinking is based on a precisely defined system. All mathematicians who teach algebra share virtually all algebraic ideas. Each idea is strictly and precisely defined. It is possible to PROVE this or that. Given a number system, one can derive arithmetic. Given arithmetic, one can derive algebra. Given algebra, one can derive calculus. All inferences can be tested, one by one.

Essential Idea: For any subject one studies, it is important to know the extent of expert disagreement and the "variability" of what one is studying.

How to Ask Questions About Fields of Study

(Answer as many of these questions as you can by examining texts in the subject. You may need help from your instructor on some of them).

1. To what extent are there competing schools of thought within this field?
2. To what extent do experts in this field disagree about the answers they give to important questions?
3. What other fields deal with this same subject (from a different standpoint, perhaps)? To what extent are there conflicting views about this subject in light of these different standpoints?
4. To what extent, if at all, is this field properly called a science?
5. To what extent can questions asked in the field be answered definitively? To what degree are questions in this field matters of (arguable) judgment?
6. To what extent is there public pressure on professionals in the field to compromise their professional practice in light of public prejudice or vested interest?
7. What does the history of the discipline tell you about the status of knowledge in the field? How old is the field? How common is controversy over fundamental terms, theories, and orientation?

Essential Idea: Many disciplines are not definitive in their pursuit of knowledge. As you learn a subject, it is important to understand both its strengths and limitations.

How to Ask Questions About Textbooks

(Answer as many of these questions as you can by examining your textbook. You may need help from your instructor on some of them).

1. If there are competing schools of thought within this field, what is the orientation of the textbook writer(s)? Do they highlight these competing schools and detail the implications of that debate?
2. Are there other books available that approach this field from a significantly different standpoint? If there are, how should we understand the orientation or bias of this textbook?
3. Would other experts in this field disagree with any of the answers given in this textbook to important questions? How would they disagree?
4. Are there books in other fields that deal with this same subject (from a different standpoint, perhaps)? To what extent are there conflicting views about this subject in light of these different standpoints?

5. To what extent does this textbook represent this field as a science? If so, do some experts in the field disagree with this representation? In what sense is it not a science?
6. To what extent do the questions asked in this textbook lead to definitive answers? Conversely, to what extent are questions in this textbook matters of (arguable) judgment? And does the textbook help you to distinguish between these very different types of questions?

Essential Idea: Not all textbooks are equal as to quality. As you read a textbook, it is important to understand its strengths and limitations.

Conclusion

To develop as thinkers, students need to become adept at questioning. They need to actively formulate questions as they study. They also need to recognize that some disciplines deal largely with definitive questions while others deal primarily with debatable questions or question requiring reasoned judgment. As instructors it is important that we ourselves recognize whether our field of study has largely divergent or convergent viewpoints, so that we can accurately represent these fields to our students.

{Information in this article is taken from Paul, R. & Elder, L. 2001, *The Thinker's Guide to How to Study and Learn,* Dillon Beach, CA: Foundation for Critical Thinking.}