

INTRODUCTION

The purpose of *The Art of Thinking* is to introduce students to the thinking process and have them develop confidence and skill in using it to solve problems and resolve issues. That purpose dictates the form of this teacher's manual. Few "official answers" are included here. Instead, suggestions for leading class discussion of the exercises and applications are given, along with tips about the kinds of confusion students may experience and strategies for overcoming that confusion.

Although many instructors using *The Art of Thinking* have had considerable experience teaching creative and critical thinking, others have had little or no experience. The guidelines that follow will assist the latter group in making appropriate adjustments in teaching and testing approaches.

GET STUDENTS MORE INVOLVED IN CLASS

Most instructors talk a great deal more than they realize. Because they were taught by the lecture method, they teach by that method. Even when not making a formal presentation, they dominate discussions by clarifying ideas, sharing anecdotes, providing information, and explaining complex matters. Meanwhile, students sit passively, much in the same manner that they sit in front of the television set, and with a similar degree of inattention.

In order to teach thinking skills well, you must change the student's role from passive to active. The best way to do this is for you to talk less. Ask students to do little tasks you usually do, such as reading the applications aloud before discussing them and summarizing the previous day's discussion. If possible, when a student asks you a question, redirect it to another student and then ask a third student to comment on the accuracy of the answer. When going over the exercises and applications in class, have a student present his or her response and then have another evaluate that response. If the evaluation is superficial, resist the urge to add your own evaluation and instead ask a provocative question. When disputes arise and everyone appeals to you to resolve them, ask someone who hasn't yet spoken on the matter to suggest how he or she would resolve the issue. Occasionally, let an unresolved problem or issue lie, offering to give class time a day or two later to anyone who works out a solution.

If this approach seems uncomfortable at first, remind yourself that a good intellectual coach, like a good athletic coach, does not push players aside and enter the competition—he or she gets the players to raise their level of play by encouraging, guiding, and occasionally cajoling them.

WHEN YOU ASK QUESTIONS, EXTEND YOUR "WAIT TIME"

Studies show that the average instructor waits only about one second for students to answer questions. If an answer is not forthcoming by then, the instructor either asks someone else, rephrases the question, or answers himself or herself. One second is not very much time even for a simple matter of fact; for a matter involving interpretation or judgment, it is woefully inadequate. The same studies reveal that when an instructor extends the wait time to three seconds and beyond, poor students as well as good students tend to produce more ideas and better ideas and engage in lengthier and livelier discussions. As a reminder to extend your wait time, try glancing at the second hand of the clock when you ask questions and timing yourself.

DELAY YOUR REACTIONS TO STUDENT IDEAS

Many instructors give immediate affirmative or negative signals when a student answers a question or presents an idea. When such signals are given, the entire class naturally regards the matter as closed and stops thinking. And if the quickest thinkers in the class answer most of the questions and volunteer most of the ideas, that means the other students are seldom provided an opportunity to think a question through or ponder a new idea before having their thought process interrupted. Little wonder slower thinkers become discouraged.

To increase the time your students spend thinking about questions and ideas, mask your reactions while students are answering questions or volunteering comments and then look around the room mirroring the same quizzical gaze students are showing you. After counting slowly to three (or higher), ask the person who spoke to elaborate or someone else to comment on the statement. And be sure to use this approach not only when students make incorrect assertions but also when they are correct. Both kinds are worth having your class ponder.

This guideline does not mean students should be allowed to remain mired in confusion. It means only that you should give them sufficient time to extricate themselves and thus experience the satisfaction and confidence that accompany success in doing so.

CREATE A CLASSROOM ATMOSPHERE CONDUCTIVE TO THINKING

The classroom atmosphere most conducive to thinking is one in which process is valued above product. In this way, mistakes are tolerated and students are encouraged to face them honestly and learn from them, an atmosphere in which students can be adventurous in their thinking because imagination and originality are prized and in which criticism can be given and received without embarrassment or hurt feelings. Many students have never experienced such a classroom atmosphere and so may at first feel uncomfortable in it (or suspicious of you for providing it), but in time they will appreciate and thrive in it.

MAKE YOUR EXAMINATIONS EXERCISES IN THINKING

Because most of us were educated in a system that emphasized *possessing* knowledge, but not using it in any cognitive enterprise, we tend to favor objective testing. Unfortunately, the objective test is an inadequate measure of thinking proficiency: it denies students an opportunity to demonstrate their creativity, penalizes students who perceive subtleties and note relationships among ideas, denies students practice in disciplined expression, and prevents instructors from observing the process by which students reach their conclusions.

The essay test, though free from most of the defects of the objective test, presents other drawbacks. It allows students to hide paucity or complete absence of thought by multiplying words, and it takes significantly more time to grade than does an objective test (a fact of no small importance to instructors with large classes).

One way to avoid the limitations of both the objective and the essay test is to use the combination test. This test consists of these kinds of questions:

- *The Modified True/False Question.* Rather than the standard two choices, this question offers three choices: “Completely true,” “Partly true but needing qualification,” and “Completely false.” In addition, it requires students to add, in a space provided beneath each question, an explanation of every “Partly true” answer. Instructors can thus build into their tests an element of difficulty that challenges the students’ higher-order thinking skills.
- *The Modified Multiple-Choice Question.* Similar to the modified true/false question, this question offers the usual a–d or a–e choices; however, it also requires students to explain the thinking that underlies their choices. (Each question is followed by a space for this explanation.)
- *The Brief Essay Question.* This question gives students practice in composition responses in their own words, with the qualifications and even the brief examples or analogies they believe are the most relevant; yet it does not create a lengthy reading assignment for the instructor because it specifies a word limit and states that responses that exceed

the limit will be penalized. A 25-word limit is recommended for relatively simple matters and a 50- or 75-word limit for complex ones. Holding students to a word limit not only makes grading easier, but it also teaches students the value of brevity and precision and prepares those who will go on to the professions for the exacting requirements of professional publication.

The combination test is useful in almost any course with a thinking skills component. But an even better test of students' mastery of creative and critical thinking strategies is the kinds of problems and issues presented in *The Art of Thinking*. Chances are you will not be able to assign all the applications at the end of each chapter, so when the time comes to prepare midterm and final examinations, consider using some of them as test questions. (Be sure to allow enough time for students to give adequate attention to each of the stages of the thinking process.)