

# The Need For Comprehensiveness In Critical Thinking Instruction

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This paper focuses on the two most fundamental questions regarding the comprehensiveness of critical thinking: What do we need to think critically about? And, as teachers, how comprehensive does critical thinking need to be in our classrooms?

## I. WHAT DO WE NEED TO THINK CRITICALLY ABOUT?

### 1. Some Standard Answers

#### ARGUMENTS

A standard answer, one that grows out of a tradition in philosophy, is that we need to think critically about arguments. People who teach courses specifically on critical thinking (or informal logic or reasoning) often teach their students to analyze arguments, to pick out fallacies in arguments, sometimes to construct good arguments of their own. I come out of a philosophy tradition myself, and that's the way I began teaching my course in Critical Thinking back in 1976.

This is very helpful to students. They benefit from it enormously. Most of them have had very little experience in critiquing arguments, very little experience in thinking about arguments at all: understanding what the person is arguing for, what reasons the arguer is giving, accurately picking out the arguer's assumptions, fairly evaluating an argument even when they disagree with it.

For example, what reasons are there in favor of passing a Constitutional amendment allowing prayer in public schools? Are those reasons true? What evidence is there? Will this in fact promote family values? How are we to interpret that? And even if it does promote good values, is that enough of a reason to pass a national law?

Argument analysis is an important part of learning to reason well, of learning to think critically. The trouble is, that we can think critically about

a lot more things than arguments. And students need to learn to think critically about these other things as well, things that may be, for that student at least, more important to reason out than arguments. Which job should I take? What is likely to happen to me if I join a gang? How can I tell whether to believe the nutrition studies I read? Should I let my friend drive home drunk? How can I best go about studying for final exams? What will it be like five years from now if I marry Chris?

### PROBLEM-SOLVING

The need to go beyond arguments became even more apparent when the Second Wave of Critical Thinking developed, when it became clear that Critical Thinking was something needed across the curriculum, and across all grade levels.

In many fields we don't concentrate on arguments so much as on decisions that need to be made, or probable causes and effects, or actions that need to be taken, or on problem-solving generally. Nursing students need to learn how to think critically about medical emergencies, for example. Fourth graders need to learn how to think critically about problems of getting along with other children. Students in social studies need to learn how to solve problems having to do with testing hypotheses.

But the emphasis on problems, and on solving problems, again seems too restrictive. We do need to think critically about problems. No question about that.

But "problems" themselves are things that we have already identified as problematic. They are questions or difficulties that we have already extracted from our life's experiences in such a way as to define them as problems.

But what about the step before this? What about the time when I was just coasting along, a host of situations around me that would indeed be problems, except for the fact that I was completely unaware of them until they hit me over the head?

Suppose I've just applied for a job at CompuTech. I walk into the job interview, and the interviewer asks me, "Why do you want to be part of the CompuTech Organization?"

I have a problem. It's one that I've just identified. It's that I haven't the slightest idea how to answer the question, because I know next to nothing about the CompuTech Organization. I might try to problem-solve by giving a clever response to the question, or an evasive response, or an honest response. But I clearly would have been a lot better off if I had thought critically before there was an actual problem. Critical Thinking is not merely crisis management.

How many of the problems that people have in their marriages could have been anticipated and addressed—and lessened—long before they became problems?

There is another difficulty with identifying problems as the stuff we need to think critically about. It's that the term "problem" automatically conveys an idea of negativity (and it thus reinforces the aura of negativity that many people still associate with critical thinking itself). It is true that if I have a problem with my health, it makes sense to think critically about how to remedy it. But it is also true that if I'm not having any problems with my health—and even if there is no indication that I will be having some problems in the near future—it still makes sense for me to think critically about my health. It may still benefit me to think critically about my nutrition, my exercise, my interactions with others. Similarly, I may be getting along well with my supervisor at work, but thinking critically about our relationship may well improve it.

I can think critically about positive situations and thereby make them more positive, or positive in different ways, or more lasting. I can think critically just to understand and better accept situations, without automatically having to "fix" them. There are a thousand possibilities. If it ain't broke, well, you may benefit from thinking critically about it anyhow.

## 2. The Comprehensive Answer

So, back to the original question: how comprehensive is the need for critical thinking? Going beyond arguments and problems: What do we need to think critically about?

And the answer is: Everything. We need to think critically about everything, about all our experience.

Before trying to explain this comprehensive answer, I need to indicate what my conception of critical thinking is, and how critical thinking differs from ordinary, everyday, generic thinking.

### WHAT IS CRITICAL THINKING?

The conception of critical thinking that I will be using throughout this paper is not at all a narrow one. For example, critical thinking, as I use the expression, is in no way equivalent to cold rationality. Rather, emotions and intuitions play a rich, full part in thinking critically. In fact, an important problem for many of us who tend to be rationalists is to acknowledge and accept the validity and aptness of emotions and intuitions.

Suppose I am a rationalist and that I say, for example, "It shouldn't matter to me what other people think of my work. . . . The only important thing is the evidence they can bring to bear against it. My work should be

evaluated only on whether it rationally holds water; how people react to me or it personally shouldn't make any difference."

I don't think that is critical thinking. I think that's probably denial. For most of us, how other people react personally to us and our work is terribly important. Denying it, or admitting only those responses in myself which fit some template I decide to call rational, is very often to miss the dynamic of what is really going on.

On the contrary, cold rationality is typically an unrealistic and simplistic approach to figuring out the complexities of the world. An emphasis on rationality in the narrow sense is, to me, a distinctly uncritical attitude toward the situations and problems we confront.

Over against this, the conception of critical thinking that I am using is a broad one: critical thinking is reasoning things out, taking full account of all the relevant information (including information based on emotional reactions and intuitions), and doing so in accord with high intellectual standards. Richard Paul uses the phrase "taking charge of our thinking" or "taking charge of our concepts." I think that expresses it well because included in the idea of "taking charge" is the autonomy that depends on high intellectual standards.

The comprehensive answer being advocated here is the idea that thinking things out critically, in accord with high intellectual standards, is the way to deal with all aspects of our lives: professional, private, as teachers, as students, as parents, children, spouses.

Stated this way, baldly, it may sound too strong to be true. Isn't this vastly over-rating critical thinking? Isn't it making reasoning too fundamental, too all-pervasive? What about simply taking pleasure in walking along the sea? You don't need critical thinking for that. What about simply feeling love for somebody, or the feeling you sometimes get of spiritual connection with the universe? What about sitting by yourself and letting your mind be open and relaxed, letting yourself drift and just be present in the moment? Thinking critically about that situation could just ruin it. And over-analyzing things: doesn't that often just make things worse? If I over-analyze the way I swing my bat in baseball, I may very well wreck my swing.

These are legitimate worries.

But I don't think that they are worries about critical thinking. They are worries about a misapplication of critical thinking, or about a misguided idea of what critical thinking is. In the end, they are worries not about critical thinking, but about ordinary, uncritical thinking.

#### HOW DOES THINKING DIFFER FROM CRITICAL THINKING?

The key to seeing how comprehensive critical thinking needs to be is to distinguish it from the much broader domain of general, ordinary, everyday

thinking. I'll call this "thinking in the generic sense." Or I'll call it simply "thinking."

Our ordinary, everyday thinking—thinking in the generic sense—is formed of a wide variety of components: hunches, generalizations built upon experiences, wishes turned into beliefs, shrewd assessments of situations, conclusions jumped to, prejudices, childhood training, early school experiences. Our ordinary thinking is a mishmash of all kinds of factors. Some of our ordinary thinking is critical; much of it is not.

If we focus on thinking in this generic sense, then it quickly becomes clear that thinking is unavoidable. It is all-pervasive.

We are, all of us, constantly, thinking. We are not necessarily thinking well, we are not necessarily thinking critically, but we are thinking nevertheless. We are forming ideas, formulating plans, reacting to new situations on the basis of past experience; we are bored by one set of events, enthusiastic about another, depressed about a third. We desire certain consequences, and we are fearful of other consequences.

All of these are based on thinking. Take "fearing certain consequences" as an example. My house in New Orleans was broken into twice last year, and every time I go out of town for a lengthy stay, I feel this fear of someone's breaking into my house. Though it may not sound like it at first, that's an example of thinking.

It's true that there is a biological reaction—fear—that may not require thinking for it to take place. But that biological reaction does not at all account for my fear about my house being broken into. I don't particularly feel any fear of my car being broken into, or my pocket being picked, or even of my house burning down (though if these happened to me a few times, I bet I'd start having fears of them as well).

No, my fear of my house being broken into is a product of the way I conceive of it: that a break-in is a threat, that my house is linked up to my sense of self, that a break-in is more or less likely, that it will do me an appreciable amount of financial and emotional harm if it does occur. All of these are judgments on my part. All of them are the products of my thinking. And all of them may be accurate or inaccurate, appropriate or inappropriate, clear or unclear. All of them are thoughts, subject to the standards of critical thinking.

More broadly, whenever I adopt an opinion about anything or anybody, I'm thinking. I'm categorizing. I'm making judgments. I'm forming concepts and applying concepts I've formed in the past.

The same holds true of all the other activities mentioned earlier, the ones that seemed independent of critical thinking, or even opposed to critical thinking. All of them are, in fact, products of thinking (in the generic sense): they are products, first, of the concepts we have; second, of the way we

interpret situations; third, of the way we apply those concepts to those situations.

Consider taking pleasure from walking along the sea. That's not independent of thinking at all. It depends on the concept I have of the sea, of the way I think about it. James Joyce called it "the snot-green sea." If that were my concept, I'd get considerably less pleasure from having it lap at my feet as I walk along it. If I am made miserable by having to do tedious and unsatisfying labor at the seaside, I can look at the sea every day and never take pleasure in it. That's because I conceive of it—I think of it—as a place for unrewarding toil. My emotional reaction (of pleasure, of displeasure) is not simply the result of walking along the sea; it is a result of that plus the concept I have of walking along the sea. And the concept is often a more important factor than the action.

Consider the concern, one that many reflective people share, that focusing on thinking leads to over-analysis and thus to interference with many activities. This happens to some of my students, and to me too sometimes.

If I over-analyze my baseball swing, I may make it worse. But the problem is not that thinking is opposed to the easy, confident flow of muscle, intention, and sensitivity to consequences that makes up a baseball swing. The problem is that I have applied my concept of "thinking" to baseball swings in an inappropriate (i.e., uncritical) manner. If I thought through the process of batting more critically, one thing I'd be sure to do is to avoid compulsive over-analysis.

In the ordinary, generic sense of the term, it follows that students do not need to be taught to think. They already think. They sometimes think that school is worthless, for example, that science is boring, that math is scary or beyond them, that their teacher doesn't like them. A teacher's worst students think; probably they think just as much as the best students.

Their problem may be that they are not thinking well, or they are not thinking productively, or they are not thinking about the subject at hand. But they are thinking. Thinking is unavoidable.

### HOW GOOD IS OUR THINKING?

If thinking, in the generic sense, is all-pervasive, how high is the quality of that thinking? Well, it's difficult to say in general. At the least we can say it's haphazard. Some of it is good, some is bad, a lot is somewhere in the middle.

### CONCEPT FORMATION

Out of the flux and complexity of our experience we form concepts. We form concepts of parent, child, teacher, student, what a democracy is, who

is one of us and who is one of them, who I myself am. And the concepts we have formed tend, in turn, to guide our future thinking.

From a critical thinking point of view, one thing that makes this process often dysfunctional is that these concepts are acquired so uncritically. Many of them come from early childhood when we began to form the concepts of who we are, whom we need to take care of, and how much we need taking care of ourselves. Many of them come from adolescence. It's scary to think that a lot of the concepts that guide our thinking about sex may be holdovers from concepts acquired in the midst of that very confusing time in our lives.

But it's not just youth that makes concept formation so risky. In addition, many of the key concepts that regulate our lives are ones that tend to be formed in severely distorting situations. We pick up or modify concepts when we are frightened, or depressed, or feeling inadequate, or needing to impress others. My concept of what is "hopelessly overwhelming" is one that becomes formulated in my mind, not during moments of lucidity, but during the moments of darkest depression. Many of the concepts that touch off certain distorted emotional reactions were themselves probably formed during moments of distortion in our lives.

#### CONCEPTUAL CHANGE

The concepts we've formed, of course, are not static. They change over time, most of them. But that by itself is not a cause for optimism, because the changes also, like the concepts themselves, often are the result of the situations we happen to find ourselves in. (My concept of "leaving my house" has changed not as a result of critical thinking, but as a result of the accident that someone broke into my house last September.)

Our concepts also sometimes change simply because of trends. Over the last ten years, my students' thinking has changed radically toward a far greater acceptance of both homosexuality and the death penalty. It does not seem likely that the first signals an improvement in critical thinking skill, while the second signals a decline. The recent concept of suntanned skin as desirable and healthy-looking has arisen only during the last 70 years and was unthinkable for most of Asian and European history.

Sometimes our concepts change by getting harsher. Nazis, as time progressed, often became more committed to Nazism.

All of this is to say that both concept-formation and concept-change can occur as a result of innumerable circumstances: sometimes developmental, sometimes part of larger social trends, sometimes just happenstance. But in our ordinary life, neither concept-formation nor concept-change is usually the result of evidence accurately assessed, interpreted, and applied. It is usually not critical.

### 3. Why We Need to Think Critically About Everything

The basic argument of this paper is a simple one. But it has heavy consequences, both for how we think about critical thinking and for how we approach education. The argument is just this:

First. Thinking is omnipresent in our experiences. Through concept formation, thinking underlies all our attitudes, our actions, our opinions and beliefs. All our experience.

Second. The quality of that thinking is haphazard. The concepts that we do form are, in a way, largely outside our control. Without critical thinking, we seem to be the passive recipients of the concepts of our time and place, our social and individual circumstances.

The next step is also simple. It's that critical thinking is thinking that is in accord with high intellectual standards. Critical thinking involves taking charge of our thinking in line with such standards. We think critically when we pay attention to gathering accurate evidence, when we get clear about our purpose, become aware of likely consequences, form and modify our concepts on the basis of relevant and reasonable factors, rather than haphazard ones.

What follows from this is the earlier answer about how comprehensive critical thinking needs to be. We need to learn to substitute critical thinking for thinking in the generic sense. Critical thinking needs to be as comprehensive as thinking in the generic sense already is. That is to say, critical thinking needs to be about everything, about all our experience.

We need to learn to think critically about the concepts we have in place, about how they were formed, about how they regulate our future thinking and action, about how they are changing and how they should change.

The question, "How comprehensive does critical thinking need to be?" is equivalent to the question, "Which of our concepts do not need to be subject to critical scrutiny?" And the answer, it seems clear, is that all our concepts need to be subject to critical scrutiny. Any of them can be misguided; any of them can lead to inappropriate, unreasonable, dysfunctional actions and attitudes.

But the emphasis here should not be negative. The motivation for critical thinking is, once again, not just the avoidance of error or the avoidance of unreasonableness. All our concepts are subject to critical scrutiny because those concepts can be enriched and deepened by critical thinking. My relations with the people I love can be enriched by thinking critically about the way love fits in with respect for others, with not being manipulative, with the need to have independent lives, with self-esteem.



## II. HOW COMPREHENSIVE DOES CRITICAL THINKING NEED TO BE IN OUR CLASSROOMS?

How deeply does critical thinking need to extend into my classroom? What portion of my class should be devoted to teaching my students to think critically (in contrast, say, to merely giving them information about the content)? How comprehensive should critical education be?

And the same answer applies: To the extent possible, it needs to be all-pervasive. It needs to be the central agenda in all classrooms.

That sounds sweeping, and it is in a way. But it's necessary. And in a straightforward way it will make the content richer and deeper for students; it will make the information itself more memorable and lasting.) I will sketch out three general reasons why education for critical thinking needs to be all-pervasive, why all the "content" or procedures we teach our students need to be looked at from the point of view of "How will this help my students' ability to think critically through the subject matter?"

### 1. Non-Critical Teaching Techniques are Inadvertently Anti-Critical

Teachers, confronted with the desirability of teaching their students to think better, often describe themselves as having a choice between teaching for critical thinking and teaching for some desirable ends other than critical thinking—like "content" or information or proper behavior or getting along or following proper procedures.

There is, of course, nothing wrong with any of these goals. It is crucially important that students grasp information and content, that they get along, that they learn procedures. It is not these goals that are in any way misguided.

What is misguided is the idea that we can teach for these goals effectively without having students think through them critically. A critical method of teaching for information retention is to teach such information always as part of addressing important problems or questions that students need to figure out. A critical method of teaching students to get along with one another is to get them to think out the consequences of their actions (and not just to hear a teacher stating the consequences), the assumptions they make about others, the ways they interpret others' behavior, the fact that in conflicts there are usually different, equally legitimate points of view, etc.

So, in what follows, I will be contrasting critical-thinking methods for teaching such goals with non-critical-thinking methods for teaching those goals. Thus some teachers, for example, instead of teaching their students to think critically, have them simply memorize information. ("You are responsible for learning all the bold-faced terms in Chapter 12.") Or they have

students follow a prescribed plan, step by step, without thinking about it. ("To divide fractions, you invert and multiply.")

But, contrary to what one might suppose, teaching students to memorize information—as a task in and of itself—does not lay a foundation of knowledge for students to think critically about in the future; it is not neutral with respect to fostering students' critical thinking abilities. It is negative.

For what it does is to foster an uncritical idea of information itself. It fosters the idea that information is just words, arranged by someone else, unconceptualized, divorced from the contexts in which that information can be put to use. That's why it seems so much like *Trivial Pursuit*.

It is important to stress that I am not downplaying the importance of information. Information is vitally important. On the contrary, I am maintaining that it is didactic teachers who downplay the importance of information. To say it is important means that students need to be able to grasp the information (not just say the right words), to think through it and in terms of it. It has to be seen, as all thinking does, as something that has a purpose—we gather information for a purpose—as something that has implications, as something that exists in a web of concepts. Because information is vital, it is vital that it not be conceptualized as isolated and unrelated pieces, outside any frame of reference for using the information.

The same kind of thing is true of mindlessly following step-by-step procedures. Learning in this fashion helps to shape the idea that mindless following is a genuine way to solve real problems. Either that, or it promotes the idea that most students have long ago acquired: the idea that procedures you learn in school are completely irrelevant to addressing real questions in your life.

So, a consequence is that the only real alternative to a critical-thinking education is not an education that is neutral with respect to CT, but an anti-critical-thinking education.

I don't want to overstate the case here. I don't of course mean that exposure to a didactically taught course automatically turns people into bad thinkers, any more than exposure to an overly rigid basketball coach turns kids into bad basketball players. I do want to say that it adds its part, and that people who come out of a didactic educational system as critical thinkers about the content of their education are exceptions.

Each class we take that presents the goal of education as the passive receiving of fragmented information helps to shape our concepts of information, education, and our relation to education in seriously negative ways. All these ways are anti-critical in that they inhibit my ability to think through information. They inhibit it because, according to the concept of information I acquire didactically, information is something that it doesn't make sense to think through. Information is something there, given, not to be tampered with.

Unless we teach students to think critically in our classes—whatever they are, whatever subject or educational level—we inadvertently teach them to think anti-critically.

#### AN EXAMPLE

Take a biology class. Suppose the instructor teaches it by having students memorize parts of the cell, label cell diagrams so that they agree with a diagram in the book—mitochondria, endoplasmic reticulum, and the rest—maybe she has students take down extensive lecture notes. In the biology lab, she has students carry out pre-designed experiments, where failing to get the prescribed results means that the student did the experiment “wrong.” (I’m trying not to make this a parody; I’m trying to report on ways that standard didactic classes frequently run.) She gives students machine-gradable tests that require students to match terms with their appropriate descriptions.

The intention behind such teaching is a laudable one, in its way. It’s to “give” students a body of information, or facts, in biology; it’s also to “give” them a demonstration of how experiments are ideally designed to run, of “the scientific method” in action. The goal is to give the students the raw materials of biology, which they can then, at some undetermined future time, use in their critical thinking.

That’s the intention, but it’s not the reality at all. That’s not what results from didactic education, not usually. I might even say almost never. The consequence of such didactic education is that students form a warped and inappropriate idea of all the essential concepts involved, at all levels: mitochondria, cell, biology, science, education.

Take the most specific level. What are mitochondria to students who have just emerged from a didactic course? They are a set of words, quickly forgotten, eminently forgettable. Students may learn to label them on a diagram, but it’s just there: it’s of no use to them. Even if they remember the words, it’s not anything they’ll be able to use, nor to take pleasure in, nor see how it all fits together. It’s not a living part of their understanding of biological processes.

Take the concept of “cell,” at the next level of generality. To a student emerging from a didactic course, a cell is something that’s got these parts; it’s got a nucleus; it’s the basic building block of all life; it’s got something to do with DNA; some of them divide. . . . There is a real sense in which extremely few college students understand what a cell actually—functionally—is: from a high school or college biology class, they have some descriptions that they associate with cells, but it isn’t a functional part of their thinking. If you ask them a question about getting sick or catching a disease or eating their food or getting cancer or having babies or any other biological topic formulated in ordinary English, the word “cell” is not part of their response.

The same will hold true, probably even more emphatically, about the more general terms on the list. Students' concepts, of what biology, science and education are, are formed by the way we teach biology, science, and by education in general. Instead of these being vibrant domains, part of a student's own thinking, they become conceptualized as something that is in no real way the student's own. It could be said almost epigrammatically: A distinct danger of teaching a subject matter in a way that is unrelated to student thinking is that students will form a concept of that subject matter that is unrelated to their thinking.

## **2. Thinking in the Generic Sense Has Already Shaped Students' Concepts**

There is a second problem with using non-critical-thinking techniques when teaching students.

Teachers sometimes say to me that a major problem they have is that their students come into their classes knowing next to nothing about the subject matter, so the teacher has to start from the ground up. This is clearly true some of the time. Students may have no idea what mitochondria are, or technical terms in an area of study; fourth-grade students may never have heard of a country their teacher wants them to do a project on.

Yet most of the important concepts students need to learn to think through in a class are concepts that students already have—or I can more accurately say they have a version of that concept. The concepts they have may be highly inaccurate, the emphasis in their version of the concepts may be wildly exaggerated, yet they already do have a version of them in place in their minds.

Thus we as teachers do not get to write on a blank slate. Rather, we teach concepts that already have a logic in students' minds. "History," for example, is not an empty concept for students; instead, history is a concept of something that is dead, gone, irrelevant to the present. Similarly, "evolution" might seem like something one would learn about in science classes. But long before students ever get to a biology class, their concept of evolution is linked to progress, no matter how misguided that idea may be. It is also linked to the idea of "us" as the culmination of evolution.

Take an example from nursing education. It turns out that it is very difficult for nursing students to learn to wash their hands. Their teachers tell them to, of course; they explain how important it is; they tell them about the spread of infection, about how vital it is to learn to wash one's hands, . . .

It's easy to get nursing students to say the right words. On a test, they tell you right back how important handwashing is, and why. They would never defend the practice of not washing your hands. But they still don't get the concept: they don't wash their hands.

At a Conference on Infectious Diseases in 1994, the doctors—experts on infectious diseases—were observed just to see if they washed their hands after using the restroom. Only 80% of the women and 55% of the men did. And these are experts in infectious diseases.

What's going on? Why is this so hard to learn? Well, it seems pretty clear that we are comfortable, most of us, with the products of our own bodies. There is a logic to this already in place, reinforced by almost all our ordinary experience. It's that the products of my own body are safe, and therefore don't need to be washed off. I've lived intimately with my own saliva, my own germs, all through my life. . . . This deeply entrenched logic of handwashing is one that can be affected only by genuinely re-thinking our concepts. And unless this logic is affected, the education we receive has only a superficial effect on us.

The system of concepts that students use to sort the information in a course is one that is already well-established before they ever get to our classes. (That's as true in fourth grade as it is in graduate school.) It is as if people have their own filing cabinets. We teachers give them pieces of information, but they file it by their own system. And their system does not match the teacher's. In fact, if there are 20 students, there may well be 20 different filing systems.

Now you might concede that this is true for general, everyday concepts like "history" or "evolution" or "handwashing", but you might still believe that it does not hold for unfamiliar terms like "mitochondria," "quadratic equations" or "the subjunctive mood." But if you believe that, you are not taking account of the all-pervasiveness of thinking in the generic sense. To understand an unfamiliar term, we have to have concepts in place by which to categorize it. And the filing cabinets students use too often contain ready categories like "useless information," "unimportant information" (=it won't be on the test), "information that's not true but I have to say the right words" (this way I get to keep a lot of my prejudices), "idealistic stuff that teachers say." Or simply, "terms you learn in school."

Try a quick experiment. When I say "the Federal Reserve System," where does that get classified in your mind? I'll tell you that in my mind it gets classified in the category "Stuff That I Will Never Understand, So Phase Out Until the Topic Changes."

Teaching the subject matter of a course in any way that does not impinge on the underlying logic leaves intact the system of thinking that students already have in place, and it leaves intact the underlying concepts that students entered the course with.

### 3. Students Need to Learn to Think in Terms of Central Concepts, Across the Curriculum, Across Grade Levels

Finally there is a third reason why critical thinking needs to be all-pervasive in our teaching. It could be described as the problem of forgetting, but that doesn't really capture it. It is the need we all have to learn how to take the most central topics of any course of study, and internalize them, and use them as a way of understanding our experience, of turning thinking in the generic sense into critical thinking. To live rich lives, we need to take the concepts we learn in education seriously. Not all concepts of course. But some. Which ones? The central ones that are the focus of the classes we take.

#### CRITICAL THINKING AND FORGETTING

Sometimes teachers say to me that I'm just being idealistic: "Students forget 90% of what they learn in a class within just a few years. So of course they've forgotten most of their high school biology course by the time they get to college. Teaching them via critical thinking won't make them remember more."

But there is something disquieting about this response. In the first place, it is pretty clear that it's not true. We do remember more when we have thought through a subject matter than when we have memorized it.

But let me put that aside. The response is still disquieting because though we may remember only a certain portion of what we learn, the crucial factor is which part we remember. It's as if the model is one where I memorize a list of 50 terms, and remember one a year later.

When I was a junior in college, I dearly loved Romantic Poetry, so I took a course on it, and what I remember is "'Michael,' 1800." I had to memorize the dates of all the Romantic poems we studied, and the one item I remember is that Wordsworth's poem "Michael" was written in 1800. I don't even remember what the poem was about (though I think it had sheep in it).

We are bound to forget a lot, it's true, but what we remember from didactic education are not the most important terms. It's not the basic terms that we remember. Surely it would be better to learn five fundamental concepts of Romanticism well and lastingly, than to cover 100 poems fleetingly.

Forgetting is inevitable. Critical-thinking education will not make us remember everything. But our courses need to be structured critically, so that the basic, fundamental ways of thinking within the field become internalized as our ways of thinking. So that what we forget are the details, and not the unifying concepts so central to thinking in terms of the field or grade level.

## TEACHING FUNDAMENTAL CONCEPTS

For most of us, maybe it's OK to forget mitochondria, but not "cell"—not if "cell" is an important way of thinking through biology-related questions we come across later in life. If "cell" isn't so important in this way, then maybe it's OK if it's forgotten also (or remembered only as a nexus of unrelated phrases). But then what about "organism," or "ecosystem"? What about "biology" itself as a concept to use in thinking through things?

A major part of the need for comprehensiveness in critical-thinking education—across the curriculum and across all grade levels—is the need to teach students to think by means of the most central (and comprehensive) concepts being studied.

Take History as an example. There may be hundreds of concepts in a history course, but surely one of the major concepts, in any history course, is the concept of "history" itself.

Carl Sagan, the eminent astronomer, was writing in *Parade* magazine a few months ago. He was discussing the dispersal of the ancestors of *Homo sapiens* from their area of origin in East Africa. From there, they spread across Africa, Europe, Asia and Australasia. And he speculates that from this original dispersal may have derived the human instinct for travel, our "love for the open road."

That's a thrilling sort of thought, but historically, it is just ill-founded. It is very unlikely that there is anything like a human "instinct for travel." During most periods of history, most humans never left the confines of their home villages. The road was seen as a danger, not as a place for wandering or adventure or travel. Sagan takes what I think is really a modern American sentiment—"the love for the open road"—maybe even a post-automobile American sentiment, and he uncritically projects it onto humans in general.

The point is not that Carl Sagan is wrong here. The point is that he is not (at least in this instance) using the concept of "history" as part of his thinking.

He's read a lot of history, and he knows it well. Yet one of the most elementary ways of thinking historically is this: before you make a generalization about what people are like, mentally check through what you know about the past and see if it's pretty much a constant. If not, well, you can probably throw out your generalization.

Notice how different that is from merely having historically accurate knowledge of the past.

But the central concept of "history" goes deeper than this. Thinking historically is at least having the concept of "the past" as a major way we view the world. It is to have conceptualized "the past" and "the relation between the past and the present" in such a way that these become mental tools for gaining insight into the present (and maybe the future).

It is, for example, to view myself as having a past, a past that constitutes a fundamental part of who I am now. It is to view my country as having a past that is constitutive of its present (and not view the present as just the way things happen to be). Without a sense of the past, we view the day's events with blinders, isolated from the circumstances that gave rise to it.

Bill Dorman frequently talks about how his students' vision of America has about a six-month's duration. They tend not to know or remember the events that were longer ago than that. As a consequence they are unable to see any patterns in American political action. They lack a sense of history in a radical way.

The same emphasis on patterns, historical patterns, comes into play when I use the concept of "history" to look at myself. One problem often shared by people who are abused by their spouses, is that every day they "forget" the past series of abuses and think that everything will be OK. They may look only at the present instance of abuse, and it may not seem so egregious or insuperable. They may think, "If only I do X, the abuse will stop" (where X is something they have done a dozen times before). It is only by seeing my present in terms of the past that I recognize that the question is not how to deal with this or that instance of abuse; the question is how to deal with a history of abuse.

The same is true of the history of my country, or the world. With a critical conception of history as a functioning part of my thinking, the whole set of questions that I ask myself about the present, changes, deepens. Now I'll think of the Civil War in a different way: Not as something that is gone, but by asking, "How is that part of today?"

What tends to happen, as we emphasize pieces that seem unrelated to fundamental concepts, is that the focus of the course becomes diffused, students become less able to see the forest for the trees.

Suppose that a fundamental part of Romanticism is seeing nature as sacred. Then that is not just one piece of information while "'Michael,' 1800" is another. Seeing nature as sacred is the way I need to read "Michael," and the other Romantic poems as well.

Another example, much broader: We read stories, from early grades through higher education. But we seldom get a sense that seeing ourselves and others through the medium of the stories we read is both illuminating and limiting. Our stories show us things about ourselves; our stories hide things from us. That's true of "Goldilocks" and Judy Blume and Maya Angelou and *Julius Caesar* and *The Double Helix*. But those individual stories—and the details of those individual stories—though they may be very significant, are richer if seen as part of a way to acquire the critical concept of "story" itself. Though people internalize stories—it's unavoidable—they seldom internalize the concept of "stories" as a conscious, critical part of the way they think about



themselves and the world. And that's a centrally important part of a critical education.

We and our students already think in terms of the concepts we have of history, economics, science, stories, romanticism (without of course necessarily using those terms). But we think about them in the generic sense of thinking. So the concepts we have of them tend to be ill-formed, unarticulated, unexamined, and unquestioned. The heart of the Third Wave is the comprehensive goal of education in all subject matters and at all levels of education. It is to substitute critical thinking for thinking in the generic sense.

### **Endnote**

I would like especially to thank Richard Paul for help on this paper. Most of the main ideas in it were developed in conversations with him and, more generally, through our long association. That association has changed my ideas about critical thinking both in ways that I recognize and in ways that are deeper than my ability to identify. I would also like to thank Edward Johnson, and Matthew Nosich.