

## Can Case Studies Be Used to Teach Critical Thinking?

Clyde Freeman Herreid

Everyone says they want to teach critical thinking. I have seen these words used as talismans on untold numbers of grant proposals. It falls from the lips of curriculum reformers of every stripe. It has to be the number one phrase David Letterman would put at his top 10 list of clichés of grant entrepreneurs. It is the equivalent of the Holy Grail for educators—not necessarily teachers, but “educators.”

Yet average professors don’t appear to give a hoot about the term. They are content to go into the classroom and get on with the job of ripping through their lectures so they can get back to their labs and do the university’s real work—research—which ideally will bring fame and fortune to themselves and their universities.

Like many of us, I have given a lot of thought to the use of the term *critical thinking*. Just what does it mean? There are whole books written on the subject, and they haven’t helped me one bit. Except to make me feel guilty that I may not be putting enough emphasis on critical

thinking in my classroom—even if I don’t know what it is.

Let me think out loud here for a minute. Critical thinking can’t be just the content of a discipline, can it? It sounds more important than that. Yet, certainly, content must be involved; otherwise, one can’t really think about a subject about which he knows nothing. But then, how would that explain my daughter, who was a television reporter and often knew little about the subject she was covering? She had an uncanny ability to ask great questions and to pull information out of even the most irascible academician. But still, content knowledge must be in there somewhere. If this is true then, every teacher in some way must automatically be teaching critical thinking.

Surely, we must mean more than “pedagogical content knowledge” (a favorite phrase of educator Lee Schulman); otherwise critical thinking would be a trivial phrase. And our colleagues cannot be accused of pursuing trivial chimeras, can they? So, this leads me to think about process. Critical thinking must have something to do with the way we think—the way we go about problem solving and asking questions. But I struggle with this, too.

### More than a Mind-Set

I am currently a consultant to a drug company, even though I know little about the pharmaceutical business,

except what I read in *Reader’s Digest* and on the back of pill bottles. The company has asked me to develop case studies to help their employees acquire a “drug hunter mind-set.” After long discussions, the only thing I can get out of this phrase is the obvious point—they want a streamlined way to avoid all of the pitfalls and cost of going off in the wrong direction as they search the pharmacopoeia for miracle cures for aging, baldness, cancer, impotence, sleepwalking, and mean-spiritedness.

I have not found any magic wand to do this; if it existed, others would have been there long ago. But I do believe there are better ways to solve problems—by developing habits of mind that speed things along. They include problem solving, skepticism, flexibility, and seeing alternative strategies when others see only one way.

Let’s take problem solving. Once again, this seems tied to specific content. I know that there are problem-solving exercises some authorities recommend—the “thinking out of the box” thing—but I don’t know of any evidence to support that they improve one’s approach to problems. Maybe the data exist, but I don’t know of any. It is hard to imagine that working crossword puzzles, reading Ann Landers’ opinions about personal crises, or letting your inner child out to play with finger paints helps you achieve

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the drug hunter mind-set. But maybe it does. Frankly, I think if you want to improve someone's ability in chemistry, you ought to have them do chemistry and grapple with chemical problems.

Pardon me, but I am back to the idea that critical thinking is discipline-specific. What you really want in someone is creativity, curiosity, and skepticism in problem solving—someone who really wants to know the answers. I don't know, really, how you achieve this. We all know some people who really want to know answers, and we know hundreds who don't. Perhaps it is a genetic or a learned trait that is bestowed upon us early. But even if it is, I think we can train people to be more inquisitive.

If I had to choose one general characteristic that cuts across smart people it would be skepticism—the ability to ask oneself and others if the conclusions and data are correct. Smart people silently or openly say, “What is the evidence for this or that idea? Why should I believe this? Are there other explanations for the data? Is there another way to explain the data? What do you mean when you say this?” If you routinely ask such questions, even when dealing with subjects out of your own area of expertise, you will be well off. Certainly, this is true in the political arena. We have just had a terrible brouhaha—fiasco, is more like it—over the war in Iraq. Assumptions and hearsay, rather than evidence, dominated the debate.

Would that we could imbue skepticism into the American public about UFOs, psychic healing, astrology, creation “science,” and a host of other paranormal claims. This goes for TV infomercials touting hair replacements, exercise equipment, vitamin therapy, and so forth. And it goes for supposed experts in our own disciplines as well. Asking to see the evidence is a good

thing. It helps if you have a little background in statistics too!

Now, how can we develop this habit of mind in our students? The best way is to model it ourselves. Constantly, in lectures and discussions, we should openly ask: “Why should we believe this?” But this isn't enough. Most of us only got good at this in our careers as graduate students. It happened as we gained experience, read original literature, and attended journal clubs

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where articles were repeatedly attacked. Then we rose eagerly to the challenge. Soon we were emulating our mentors and sneering at claims of authors and doubting everything. There was probably even a stage where we were apt to be hypercritical and see nothing of worth in even excellent papers because of some trivial transgression in procedure. If this is scenario is correct, then skepticism can be taught!

This brings me to case studies. If reading, arguing, and challenging are hallmarks of critical thinking, then case studies are the poster children for the process. Most of them are discipline specific, certainly. But they all grapple with the essence of critical thinking—asking for evidence—developing a habit of mind that should permeate everyday life. Many case studies deal with real social problems such as global warming, pollution, environmental degradation, and medical problems. I like the ones that deal with general problems: How to develop a dossier when seeking a job. Does prayer help heal

the sick? Does acupuncture work? Such cases can be used in many different disciplines because of their general nature.

### Best-Case Scenario

The best case technique that I know is one called the “Interrupted Case Method.” Readers can see a version of it on the National Center for Case Study Teaching in Science website, titled “Mom Always Liked You Best.” The method begins when the teacher gives students (ideally working in groups) a problem faced by real researchers. He asks the students to come up with a tentative approach to solving the problem. After students work for about 15 minutes, the professor asks them to report their thoughts. Then the teacher provides some additional information about the problem saying that the real scientists who struggled with the problem decided to do it in a certain way.

The professor tells of additional difficulties and asks students to brainstorm solutions. Again, they report after discussions. Then, perhaps the teacher provides additional data for their interpretation. Students consult with their teammates and report out. Again, the instructor gives them the interpretation offered by the original authors. And so on.

The interrupted case has enormous virtues. Students struggle with a real research problem and challenge each other and the data. Most importantly, they see different groups offering alternative approaches to the problem, and they see model behavior from the experts. I love this method because it is the way real science works—we have to work with incomplete data, make tentative hypotheses, collect more information, refine our hypotheses, make more predictions, get more data, and so on. In fact, this interrupted method is the very one that I use in workshops with the pharma-

## The Case Study

ceutical industry, training folks there to attack problems. They like it, too.

So, I would argue that the case method has the real potential to develop the same skepticism that we all developed in graduate school when we analyzed research papers and saw what went on in the collection of data. The trouble with the lecture method is that it seldom exposes students to what really happens in the process of collecting data. Once students see this, they are forever changed. They rapidly recognize that there are alternative ways of attacking a problem and alternative interpretations of the data. They begin to doubt.

Most textbooks and lectures give purported facts as if they were received wisdom—wisdom that is certain and irrefutable. This is a great disservice. Students are not

likely to question how we know a particular fact if we speak *ex cathedra*. We cannot develop a drug hunter mind-set this way, or any other type of inquiring mind.

William Perry, the Harvard psychologist famous for outlining the Perry model of student development, pointed out that the earliest stage in the maturity of students is the “dualist.” The dualist student sees the teacher and parents as absolute authority figures and everything in the textbook as correct. There are always right and wrong answers to questions. The job for these students is to learn that what teachers say is truth and regurgitate it back on the tests. The trouble with the lecture method is that it perpetuates this stage in students. Further, it distorts the actual way that sci-

ence is accomplished. Students are left with the idea that Newton, sitting under an apple tree, was bonked on the head and gravity was born—it was all “eureka!”

Case studies don’t do this. They show the messy, get-the-hands-dirty approach that is the real science. Cases demand skepticism, flexibility, and the ability to see alternative approaches. Problem solving is its *sine qua non*. In short, cases demand critical thinking.

### Reference

Herreid, C.F. 2001. *Mom Always Liked You Best: Examining the Hypothesis of Parental Favoritism*. Available online from the National Center for Case Study Teaching in Science at [ublib.buffalo.edu/libraries/projects/cases/case.html](http://ublib.buffalo.edu/libraries/projects/cases/case.html).

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