

**Richard Paul's Approach to Critical Thinking:
Comprehensiveness, Systematicity, and Practicality**

by Gerald Nosich

**Professor Emeritus, SUNY Buffalo State, University of New Orleans
Senior Fellow, Bertrand Russell Chair, Foundation for Critical Thinking**

Abstract

Richard Paul changed the face and the practice of critical thinking for hundreds of thousands of educators, professionals, and reflective persons across the world. In this paper I describe Paul's goals and, briefly, some of his achievements in articulating his robust approach to critical thinking. I focus primarily on its direct orientation to *practicality*; its *comprehensiveness*, its applicability in any domain; and its *systematicity*, its coherent, interlocking way of laying out all the significant dimensions of critical thinking consistent with use in practice. I also describe some implications of Paul's work: its relation to other models or approaches that are more limited in their comprehensiveness, systematicity, and/or practicality; the contrast between Paul's maximally flexible account and accounts or teaching practices based on specific directives; and the capacity Paul's articulation carries with it of being able to enhance any approach to thinking things through.

Key words: Richard Paul, critical thinking, practicality

I first met Richard Paul in the year 1982. He was using my book *Reasons and Arguments* in his undergraduate course, and he invited me to present at the Second International Conference on Critical Thinking and Educational Reform. He was just then beginning to articulate his conception of critical thinking. Later, he invited me to join him for a year in 1991-1992 as Assistant Director of the Center for Critical Thinking. During that time, we worked together on conceptualizing and articulating the central dimensions of critical thinking: the elements, standards, traits, and barriers that are the heart of Richard's substantive approach. Over the years, all the way up until his death in 2015, Richard, Linda Elder and I continued to refine, grapple with, elaborate on, extend (and sometimes argue about) the central features of critical thinking and its application to addressing life issues, ethics, pedagogy and fostering the creation of critical societies.

In this paper I will try to show what Richard was aiming for, what he was trying overall to do, and why his articulation of critical thinking is so powerful. His emphasis throughout is on what I would call "theory-of-use." His goal was not to articulate an abstract theory of critical thinking, but to spell out how to actually engage in critical thinking about any subject matter, to articulate an approach that is comprehensive, systematic, and eminently suitable for practice.

Second, I will briefly lay out the main features of Richard's articulation of critical thinking: elements, standards, traits, and barriers; and, third, I'll contrast it with other approaches that are, in essence, partial or restricted: problem-solving, argumentation theory, scientific method, and several others.

Finally, I'll describe some of the costs inherent in using Richard's approach. There are costs built into *any* way of doing critical thinking, or of teaching critical thinking.

Though I would argue that the benefits of using and teaching Richard's approach vastly outweigh its costs, it is still the case that there is a cost to its comprehensiveness, to its systematicity, indeed to its usefulness in practice. I'll close by mentioning briefly an additional benefit, and that is the way Richard's articulation enhances any other approach to critical thinking.

1. What Paul Was After: An Account of Critical Thinking that Is Comprehensive, Systematic, and Directly Practical

"Philosophers have hitherto only *interpreted* the world in various ways; the point, however, is to *change* it." Karl Marx, *Theses on Feuerbach*, Thesis XI

One focus of this essay is to lay out Richard's articulation of critical thinking, his approach to it. In this section, though, I want to describe what I see Richard as hoping to achieve in that articulation. I'll be focusing on what he was after as he worked out the main dimensions of critical thinking, and the main aspects of those dimensions.

In this paper, I'll usually be calling Richard's work his "approach" to critical thinking, rather than his "model" of critical thinking. It could also legitimately be called "a framework" for critical thinking. A more precise word, though, is "articulation." His is an *articulation* of critical thinking: he lays out, explains, and organizes the features that are essential to any way of engaging in critical thinking. A "model" by contrast, is a method for how to think something through (or how to teach someone to think something through). Models of critical thinking use or rely on the essential features in Richard's articulation or approach.

What was he after?

Richard was after the same thing he worked toward at least as far back as graduate school. But likely it was a main drive of his

life from long before that. Again, he was not trying just to construct an explication of how critical thinking works in the abstract. Thus his goal was not primarily to develop what people might call a "theory" of critical thinking. Although Richard did not share many of the central political or economic views of Marx, Richard's work always manifested Marx's famous Thesis XI, cited in the epigraph, that the point was to change the world. On the other hand, he was also not trying just to develop a set of disparate skills, steps, tips, rules of thumb, or "best practices" that might, in this or that situation, help someone engage in actual critical thinking. Thus his goal was not fundamentally to construct a "toolbox" for the practice of critical thinking.

He was not really very interested in what you might describe as up-in-the-air theory or down-in-the-trenches practice (or even in both of those simultaneously). He *did* engage in both theory and practice, but those were not what he was really after.

He was aiming instead for what you might call "a theory of practice," a "theory of use": an account of how you can actually use critical thinking in practice. An analogy is the classic distinction between science and engineering. Science, in this distinction, is concerned with finding out what happens and why; engineering, on the other hand, is concerned with applying the knowledge of what-happens-and-why to accomplish some purpose. Roughly, it is the distinction between asking "What is true?" and asking "How can I use it?" In chemistry, a science, the goal is to articulate the full theory of how substances interact chemically; in chemical engineering, the goal is to apply the relevant findings in chemistry to projects such as creating a workable drawing compound. In biology, a science, the goal is to lay out how living things work; in medicine, by contrast, essentially a field of engineering, the goal is to use the findings of biology to keep people alive and healthy. The goal in biology is *not* to keep

people healthy: an unhealthy person is every bit as biologically interesting as a healthy person (“Just look at how those fascinating little bacilli are eating away at that organ.”) Richard’s goal, then, was fundamentally an engineering-centered one: he wanted to keep our thinking healthy. More specifically, what he was aiming for was to work out and articulate a conception of critical thinking that is both *comprehensive* and *systematic* and that is directly usable in practice.

The comprehensiveness and systematicity—as well as the focus on usable practice—are essential to seeing what Richard was after in his work on critical thinking. The *comprehensiveness* I am describing is a comprehensiveness of *applicability*: an approach to critical thinking that applies *everywhere* and entails two aspects—to articulate a coherent way to actively engage in critical thinking

- about *any* subject matter—a decision, a discipline (such as nursing, sociology, history), an artwork, an essay, a scientific theory or experiment, an artwork, a set of observations, in fact, *anything*;
- within or about *any* activity that involves thinking such as reading, writing, creating, listening, analyzing, evaluating, playing a sport, counseling, driving a car—again virtually any way of doing anything.

The *systematicity* in Richard’s approach emerges in his attempt to articulate, so far as possible, an account of critical thinking that, first, lays out *all* the main dimensions of critical thinking and, second, articulates them in such a way as to make them usable in practice. (The emphasis on practice again brings out the proviso that is central to understanding Richard’s approach: what he was after was a “theory of use” rather than a theory-in-the-abstract.) He tried to achieve this systematicity by laying out what he saw as all the *elements* of reasoning, the most important

standards of criticality, a selection of the *traits* of mind that in his judgment were virtually always relevant, and two general barriers that he considered the key ones that stand in the way of critical thinking. The systematicity he was aiming for is not a step-by-step process—he saw step-by-step procedures as actually tending to undermine critical thinking—but rather a systematicity that comes about by covering, in an encompassable way, all the essential aspects of critical thinking that help directly in the practical work of thinking things through.

I will try to show, throughout this paper, some of the primary ways in which Richard’s articulation is comprehensive, systematic, and practical. His approach is specifically designed (a) to apply, in a direct and unrestricted way, to any subject matter whatsoever, (b) to lay out the essential dimensions and concepts of critical thinking, and (c) to be eminently usable in practice.

In this brief article, there is space to give only a bare outline of the comprehensiveness and systematicity of Richard’s approach, and to detail only briefly the way he integrates theory and practical application.

2. Richard Paul’s Articulation of Critical Thinking

Informally, Richard often defined critical thinking as “thinking about your thinking in order to make it better.” He believed that thinking—reasoning something out—is essentially the same kind of thing no matter what it is applied to. Consider thinking about a range of different kinds of topics, questions, issues, or situations. I might be thinking about an artwork, an experiment, a literary or philosophical essay, a nursing intervention, a therapeutic practice I engage in professionally, or a decision I have to make. I might be thinking about my parenting, my teaching, or something as mundane as driving

a car.

It is easy to be impressed by the striking differences among these varied areas and topics. Indeed, there are clear differences among them, differences so great the topics may seem to occupy entirely different worlds of discourse. The goals of art criticism, say, are very different from the goals of chemistry, and the questions or problems will be strikingly different in each. Similarly, the kind of information I search for in a sociological study will be entirely different from the kind of information I search for in quantum mechanics. The background assumptions I bring to bear in accounting will be worlds apart from the ones I bring to bear in literary criticism. There may be little or no overlap in the kinds of concepts I use to think through different areas. The implications of inquiry in jurisprudence will be different from those in biology, and so will the kinds of conclusions I draw, and the ways I interpret what's going on, and the points of view I need to consider. There is arguably a distinctive point of view intrinsic to being a good therapist, and a therapeutic point of view is, in many respects, utterly different from the point of view of a nurse, a mathematician, or a student just concerned with graduating.

With good reason we often lament the artificial silos that separate one academic discipline from another, or that separate academic disciplines from the areas of concern in everyday life such as thinking about becoming a better parent, deciding on a career, or playing a sport. But it is clear that, though there is great potential for rich overlap and cross-fertilization among many of these areas, there are major differences from one to another.

What Richard believed was that, no matter how strikingly different these areas are from one another, the critical thinking in each of them is, at core, the same (or at least very similar). It is true that thinking in each of these areas may, as just described, have

different *goals*, address different *questions*, use different kinds of *information*, bring different *assumptions* to bear, use different *concepts*, have different *implications*, draw different kinds of *conclusions*, and come from very different *points of view*. But the eight italicized terms form a deep commonalty that runs across all domains and academic and professional subjects. Richard would say these italicized concepts are what in fact *constitute* reasoning within any subject. Richard refers to them as *elements of reasoning*, or *structures of thought*. When you “think about your thinking,” these elements are a major part of what you think about. They form one of the major dimensions of Richard Paul’s framework for critical thinking.

Another central dimension of Richard’s approach to critical thinking is what Richard calls “intellectual standards.” These are the criteria used to judge the quality of the reasoning. His approach initially highlighted eight of them (many hundreds or more exist in ordinary languages). There is nothing definitive about these eight. They are the ones Richard and I concluded (when we worked together in 1991) were most central across the greatest range of subject matters and activities. These are *clarity, precision, relevance, accuracy, breadth, depth, significance, logicalness*. The standard of *fairness* was added as an essential intellectual standard by Paul and Elder around 1995.

Standards of critical thinking run across all areas. Art historians may be thinking about paintings, counselors about their clients’ well-being, philosophers about what Aristotle means by “flourishing,” literary scholars about the way Emily Dickinson uses half-rhymes, teachers about their students’ learning, and drivers about how to manage their cars in dangerous conditions. What people are thinking about in each of those areas is utterly different. But in each area they need their thinking to be *accurate*. They want their thinking to be *relevant* to the issue

they are focusing on, and they want to pay attention to the most *significant* or *important* aspects of the issue rather than to those that are trivial. They strive to be as precise as the area and the issue permit them to be. In other words, they want their thinking to adhere to the intellectual standards of *clarity*, *accuracy*, *relevance*, *significance* and *precision*. These, again, along with *depth*, *breadth*, *logicalness*, and *fairness*, are the standards Richard considered most widely applicable for thinking critically. Academic disciplines, by contrast, typically emphasize more specialized standards in addition to Paul and Elder's nine. For example, *statistically significant* is a standard in statistics; *controlled* and *double-blind* are standards for experiments in social sciences, and *historically appropriate* is a standard by which explanations in historical fields are evaluated. When "you think about your thinking in order to make it better," within an academic discipline or out in the world at large, the standards that Richard laid out are a major part of what you think about. Hence, they form the second major dimension of critical thinking.

In many places Richard called these "*universal* intellectual standards" and maintained that they pervade thinking in all cultures and time periods. This "universality" is an integral part of the comprehensiveness Richard was aiming for. In Scriven and Paul's classic definition of critical thinking, they are called "universal values" (Scriven & Paul, 1987). The claim to universality may sound implausible. In conversations with Richard, I ended up unsure of how strictly or in what sense he held to this universality, and I'm also not sure of whether I agree on the extent to which the standards are "universal." I am sure that what he meant was certainly not a claim to cultural superiority. Quite the opposite in fact. My own take on the question of universality is that there may well be profoundly different ways in which cultures determine *what* is accurate (or relevant or the rest); still, all

cultures value accuracy (and relevance and the rest). As Richard would often say, representatives of cultures would not say "In our culture we are not concerned with being accurate, clear, or relevant." The arrogance and implicit superiority, Richard would say, is on the part of those who would claim that other cultures do *not* value such intellectual standards. Thus, cultures may of course disagree about whether this or that is accurate, or whether this event is relevant to that event. Moreover, there may in many cases be no neutral way to settle such different point-of-view laden questions, and as a result, different points of view may be reasonable even when they conflict with one another.

In addition to the elements of thought and the intellectual standards, there are two other dimensions of critical thinking in Richard's articulation. One of them is what he calls "intellectual virtues" or "intellectual traits of mind." These are the traits, not of critical thinking itself, but of a critical thinker. Once again Richard sees them as running across all areas of inquiry. As with the standards, Richard certainly does not attempt to have a complete list of intellectual virtues (it is unlikely that there could be such a thing as a "complete list"). He and I worked through a large number of relevant traits of mind, and we settled on these eight in particular because it seemed to us that traits such as intellectual humility, intellectual perseverance, intellectual empathy, and fair-mindedness were parts of being a critical thinker in any domain. As he and I worked on the virtues back in the 1980s, we never strongly addressed the extent to which we thought they were "universal," but Richard did think that cultivating these traits (and other related traits of mind) was essential to developing oneself as a thinker.

The remaining dimension of critical thinking for Richard is the barriers or impediments. He stresses two barriers, both of them having close ties to his abiding ethics-related concerns. Both *egocentricity* and

sociocentricity are major impediments to one's critical thinking. Thus, once again, part of "thinking about my thinking in order to make it better" involves seriously evaluating, as well as I can, the extent to which my thinking about this or that topic is being influenced by my own egocentricity and sociocentricity.

As with the elements, standards and traits, the impediments also run across thinking in any domain. They operate mostly unconsciously (though I often can feel egocentricity at work in me as a kind of uneasy dissonance that I can't put my finger on). The workings of sociocentricity are often much harder to identify in myself, in part because sociocentric assumptions and conclusions may be heartily reinforced by others in my group (fellow Americans, fellow physicists, fellow philosophers, fellow parents, fellow critical-thinking theorists, fellow inhabitants of the early twenty-first century). In their critical-thinking textbook, Paul and Elder (2012a) do a disturbingly trenchant job of revealing some characteristic sociocentric tendencies commonly found within academic fields.

A Brief Note on the Systematicity of Paul's Articulation of Critical Thinking

It could be argued that there are five dimensions of critical thinking. You can picture it this way: There is *what the person is thinking about when she thinks about her thinking*. There is the *quality* of the thinking. There is the specific *process* or act of thinking that the person is engaged in. There is also the *person* herself or himself who is doing the thinking. This last dimension has two aspects: (1) the characteristics that make one a critical thinker and (2) the obstacles that get in the way of one being a critical thinker.

As I briefly sketched in this section, Richard addressed four of these dimensions extensively:

- What do you think about when you think about your thinking?

→ The *elements of thought*.

- What are the qualities that make your thinking better?

The *intellectual standards*.

- What are the characteristics that make one a critical thinker?

→ The *intellectual virtues* or traits of mind.

- What gets in the way in a person's thinking?

→ The *barriers* or impediments.

The remaining dimension consists of the actual processes we engage in when we are thinking. Richard was well aware of the processes in Bloom's taxonomy (indeed, he wrote about them as far back as the 1980s (Paul, 1985). But it is the dimension that Richard addressed least. To Richard (in conversations) this was the dimension he saw as least productive in helping a person think more critically, or learn to think more critically. Clearly, there is a difference (à la Bloom) between the process of *analyzing* a rule (for example) and the process of *applying* it. But, again, Richard's main goal was to give an articulation that helped one think better (and to live better), and he didn't believe that focusing on the differences among these processes helped one actually engage in these processes more clearly, accurately, and relevantly. Focusing on these processes had, for him, less pay-off in practice than focusing on the other dimensions.

Interestingly, he did value the way I laid out various processes in my *Learning to Think Things Through*, but what he particularly valued there was the inclusion of *action* as one of the processes (Nosich, 2012, pp. 171-172). It is instructive that what he liked there was conceiving of actual activities in the world as critical-thinking processes. Thus, I can engage

in the cognitive process of *applying*; I can do so critically or un-critically, reflectively or unreflectively; and as I engage in application, I can pay attention to what is clear, accurate and relevant. I can engage in an activity such as parenting my child through a potentially traumatic experience, and I can do so either critically or un-critically, reflectively or unreflectively. When I engage in that parenting, I can either pay attention to what is clear, accurate, and relevant or not pay attention. In this way, parenting becomes a version of a cognitive process, a process that is suffused with and shaped by thought.

When Richard did focus on processes, he concentrated on two: analysis and evaluation. These two are often conflated in practice, and that conflation has serious negative consequences for critical thinking. So distinguishing these two processes, has strong practical value for thinking in everyday life. One of Richard's most succinct definitions of critical thinking is that it is "analyzing and evaluating thinking with a view to improving it" (Paul & Elder, 2016, p.2).

Are there other dimensions of critical thinking beyond these five? It's a good question. Richard, Linda Elder and I often discussed another dimension, and Richard sometimes wished he'd had more time to devote to what might be called the contextual dimension: the political, societal, economic, and cultural context in which the thinking takes place. These are dealt with briefly in Paul and Elder's *Thinkers Guide to Asking Essential Questions* (Paul & Elder, 2010).

Because of space limitations, in Sections 3 and 4 I will focus my remarks primarily on the elements of reasoning and the intellectual standards (though I believe my account also applies to the traits of mind and the barriers).

3. The Comprehensiveness and

Systematicity of Other Approaches to Critical Thinking

In this section I want to contrast Richard's approach to a range of other approaches to critical thinking. In particular, I will focus on what I have been calling the comprehensiveness and systematicity of Richard's approach and the way it contrasts with and can enhance other approaches.

In what follows, it is important to see and keep in mind the unrestricted applicability of critical thinking itself. A key insight is that *you can think critically about anything*. A vastly abbreviated selection of items will give the flavor of that "anything."

A Selection of Items in the Domain of Critical Thinking

The domain of critical thinking includes linguistic items of all varieties: arguments, essays, stories, dramas, poems, scientific theories, unscientific theories, folk-tales, ancient texts It includes physical objects of all varieties: planets, pathogens, biological entities and organs, dust, statuary (both accomplished and banal), gasoline It includes aesthetic objects of all varieties (such as still lifes, statuary, Sung negative space, and Lascaux bison). It includes intangibles such as emotions, interstellar space, and the constitution of the United Kingdom. The domain also includes processes of all sorts: conducting investigations, inquiry, critical thinking, uncritical thinking, Darwinian evolution, scientific or aesthetic or military thinking It includes people, both individuals such as Oscar Wilde and groups such as Trobriand Islanders and 15th-Century Florentines It includes hard-to-classify items such as nonsense, spending a year as a *coyote*, falling in love, the universe, pi, the real numbers, being and nothingness.

I list these items in particular because I personally have read well-reasoned, reflective, perceptive books written about each of them.

The authors of those books were thinking critically about them. Notice that it follows from this that any approach to critical thinking which limits the kinds of items that can be thought about critically is automatically less-than-comprehensive. A good measure, then, of the comprehensiveness of an approach to critical thinking is the extent to which using that approach would help someone think through the very different items listed (as well as any other items you can add).

As part of the contrast with Richard's articulation, I will describe four families of critical thinking approaches. Each of these ways of articulating critical thinking, I will argue, is intrinsically partial and/or restricted. They are restricted to certain domains; or they focus only on some skills or steps of critical thinking, leaving others out; or they omit crucial aspects of critical thinking, either completely or by-and-large. Thus, my classification of these approaches will be centered on what I am calling "comprehensiveness" and "systematicity," as well as on their usability in practice.

Restricted-Domain Approaches

Some approaches to critical thinking are restricted in their application. There is a restriction in the domain to which these approaches apply. Among those, some are intentionally and perhaps justifiably restricted. Nursing Process, cognitive processing therapy (CPT), and writing processes are examples. So are argumentation theory and problem-solving approaches. Each of these is constructed to help people think through items in a specific important domain: patients, clients, writing, arguments, problems, and so forth. There is sometimes an implied hope (or perhaps an assumption) that these methods may help people think critically about items outside the specifically targeted domain, but the approaches are not constructed explicitly for that larger application.

Nursing Process makes a good example, one that is representative of other restricted-domain approaches. Non-nurses do not often think of Nursing Process as an approach to critical thinking, but if it is done reflectively and, most importantly, with attention to critical-thinking standards, it seems clearly to be one. Though there are somewhat different descriptions of Nursing Process, its five standard steps are assessing, diagnosing, planning, implementing, and evaluating. It is a way of thinking through and then thoughtfully carrying out nursing care of a patient. As far as its restrictedness goes, it is far too obvious and beside-the-point to note that Nursing Process does not help a nurse think critically about Renaissance paintings, voting behavior, or Newton's Laws. It is intended to help nurses think critically about patients and how to address their medical situation as a nurse.

But there are other restrictions that are not so obvious. There is far more to being a nurse than thinking about anything dealt with in nursing process. Nursing Process does not, for example, appreciably help a nurse think through how to take account of the politics of the workplace and the effect that has on either clients or nurses; how to deal with the emotional reactions of patients, doctors, and other nurses; how best to respond to the push, in many medical facilities, to put economic considerations over patient welfare; how to process the frustrations of dealing with Medicare, insurance companies, sometimes egocentric surgeons, and dress codes, or how to reason clearly, accurately, and relevantly about the dozens of other complex issues nurses regularly encounter. All of these are situations, issues, and questions a nurse will face and should think critically about.

The same is true for the other items in this category. Argumentation theory helps you think critically about argumentation. As with the nursing process, it gives little help thinking about Renaissance paintings, voting behavior, or Newton's Laws, although it does

help you think critically about *arguments* about Renaissance paintings, voting behavior, or Newton's Laws. But, aside from such more-or-less distant domains, argumentation theory is restricted even within the domain of argumentation itself, and thus it furnishes no special insight into how to think critically about any number of other issues that surround argumentation in real life. How, for example, should I budget my time so as to produce a good argument and still take care of my family? How does my use of argumentation theory fit with concerns about my dyslexia, or my ambivalence about school, or the fact that my argumentation instructor seems to dislike me? Or (as a teacher now) what should I do to help my students get a better grasp of *cogency* in arguments? Or how can I refine the teaching methods I use in class?... and so forth. An unlimited number of crucial questions swirl around the actual practice of learning, using, and teaching argumentation. That is, once I embed argumentation in an actual lived setting, with all the intrusions and complications that actual settings bring in, there is far more to deal with in "argumentation" than is furnished by argumentation theory.

Comparing Nursing Process to argumentation theory is revealing. Scholars who write about critical thinking in general seldom mention processes such as CPT and Nursing Process as "critical-thinking approaches"--the work of the Faciones is a notable exception to this (Facione & Facione, 2008). To me it seems almost willfully provincial that focusing on how to think well about arguments, as in argumentation theory, should be thought of as virtually paradigmatic of critical thinking, while approaches that address how to think well about patients and clients are marginalized or ignored. Again, processes, such as CPT, Nursing Process, or, for that matter, analyzing and evaluating arguments, will tend to be critical-thinking processes to the extent that they involve reflectiveness and, most importantly, attention

to critical-thinking standards.

Interestingly, scientific method also falls into this restricted-domain category. Though there are different accounts of what constitutes "scientific method," *hypothesis-making* and *careful testing of the hypothesis* seem to be essential parts of all of them. It should be clear that there is a whole host of questions, issues, situations, and so forth, where scientific method is of no real help. This includes far more than just the standard trigger-point issues around the extent to which scientific method applies to religion, art, or the study of history. For instance, suppose you are walking in an unfamiliar neighborhood at dusk and you start being concerned about whether it is dangerous or not. The situation is a prime candidate for something to assess critically. But scientific method would be of little or no help. You might make a hypothesis, but controlled or careful testing makes no sense at all. Even if you had sufficient time, you still couldn't test it. The situation is too specific (this particular neighborhood, this particular moment); it is too subject to initial conditions (were the neighborhood thugs not present because they were accidentally delayed by ten minutes?); and there are too many variables (weather, population density, local poverty levels...). Most actual life-situations have the same problems of specificity, sensitivity to initial conditions, and an over-abundance of variables. Scientific method helps primarily with states of affairs that are general, have a good deal of stability, and where only a limited number of variables are relevant.

Extrapolating from my description of Nursing Process and argument analysis, it is clear that scientific method does not help people reason about many aspects of science—at least science as it is embedded in actual lived situations. Take hypothesis-making. Scientific method does not help me come up with my hypotheses in the first place; it does not help me state them clearly; it does not help me think up a good empirical test; it

does not help me communicate my hypothesis to my research assistants; it does not help in motivating me or them to persevere; and so forth. Even the claim that a hypothesis is necessary is either doubtful or elliptical: Milgram's famous obedience experiments had no hypotheses. They were designed open-mindedly to see what happens in obedience-inducing situations (Blass, 2004, p. 291).

Much like argumentation theory and scientific method, problem-solving is also sometimes put forward as a model of critical thinking overall. But, since we can think critically about anything, about X (no matter what X is), it follows that critical thinking can't just be thinking about information. It can't just be thinking about problems or just thinking about questions, or just thinking about arguments. So critical thinking can't be the same thing as problem-solving. Notice two different points about this. First: While it's true that "solving problems" can certainly be an important part of critical thinking, it is also important to be able not just to *solve* problems, but also to *notice* problems, to *formulate* them clearly so they *can* be solved, to understand them in the light of the problems I faced last week, to anticipate further problems they bring up, and so forth. Second, critical thinking can be focused on "items" that are far removed from what we call problems. You can think critically about wellness, about perfection, about bliss, about being in love, about *dolce far niente*, about "flow," about lazy contentment. Each of these, in different ways, embodies the idea of the *absence* of problems. In fact, you could think critically specifically about that: about the state of having no problems, about "problem-less-ness."

Approaches Based on Individuated Skills or Steps

Some approaches to critical thinking focus on certain steps or skills. In so doing, they leave out others that, depending on the situation, may be essential. The result

is a serious loss in systematicity. Moreover, approaches based on individuated skills or steps may also fall into the category of restricted-domain approaches. An argumentation approach may lay out major steps in analyzing, evaluating, or constructing arguments (as did my own approach in *Reasons and Arguments* (Nosich, 1982). A problem-solving approach will do the same with respect to addressing *problems*. But, depending on the skills or steps selected, there can be a serious loss of comprehensiveness as well. Thus, if an approach to critical thinking focuses on skills or steps that apply only to linguistic items such as arguments or theories, they will not appreciably enhance one's ability to think critically about non-linguistic items such as paintings or patients. A list of important steps in problem-solving may not be of much help in thinking through items that are not problems at all.

Richard's earlier work (before 1991) gives an instructive example of a skill-based approach. Before Richard came up with the elements and standards, he had a list of what he called "strategies." The strategies included "affective strategies" (such as "developing intellectual courage"); "macro-abilities" (such as "comparing analogous situations: transferring insights to new contexts"); and "micro-skills" (such as "distinguishing relevant from irrelevant facts") (Paul & Binker, 1990).

To me, it's an insightful and invigorating list. It includes some refreshingly global items, such as "practicing Socratic discussion: clarifying and questioning beliefs, theories, or perspectives" and "reasoning dialogically: comparing perspectives, interpretations, or theories." It also includes strategies that center on the intellectual traits, a development of the pioneering and revolutionary work Richard had already done on these.

But if you've worked in critical thinking, you will almost immediately see

essential skills that are not on Richard's list. His list does not include, for example, abilities as central as *thinking up alternative explanations* or *gathering evidence*. Even more striking in comparison with Richard's later work, the intellectual standards—perhaps the key factor that makes thinking critical—come up only sporadically. His skills, abilities and strategies, as deep-reaching as they are, necessarily leave out others, often ones just as crucial.

I focus on Richard's "35 Strategies" because it represents a general way people often approach critical-thinking. There are a great number of such approaches, including my own attempt at comprehensiveness in Chapter 6 of my *Reasons and Arguments* (Nosich, 1982, pp. 261-284). Problem-solving approaches to critical-thinking tend to fall in this category. The heart of the category is a list of what it is important to do when thinking something through. The problem is that no list of strategies, skills, or reasoning steps is at all likely to come even close to comprehensiveness. Essential skills are invariably left out. The value of such a list will depend in part on the centrality of the skills listed, on their applicability to a wide range of contexts and issues, and on the extent to which they help engender and deepen an overall tendency to value and use critical thinking.

Using "best practices" also tends to fall into this category. If I pay attention to best practices in teaching or in medicine, for example, they may well give me models I can use as a pattern to apply to the situation I am confronted with. I will be aware, though, that there are many more situations in my teaching or professional practice that I need to think critically about, far more than can be covered by a set of best practices. There is also the ineluctable problem (one that is parallel to using scientific method) that any "best practice" has to be applied to my *specific* situation, with initial conditions that might differ radically from the ones that applied

in the best-practice model, and there will be innumerable variables that may intrude. In patterning my actions on the "best practice," I have to think critically about both of these divergences. It is not easy or straightforward to use "best practices" to guide my own practice; unfortunately, it can *seem* deceptively easy and straightforward. It would help if a critical thinking approach gave guidance in how to think through the problems of actually applying a best practice.

Though many skill- or step-based approaches can be piecemeal, hit-or-miss, or inadequate as a way of becoming a more critical-thinking person overall, there is a lot that can be said in favor of such approaches. But, in my judgment, the most egregiously piecemeal and inadequate approach to critical thinking is the teaching of fallacies. I am disturbed that it is so prevalent as a way of teaching critical-thinking courses, especially in philosophy departments. With fallacies, as with other skill- or step-based approaches, there is a list. But instead of being a list of important skills or reasoning-steps, this time it is a list of allegedly common reasoning mistakes. But on examination, it is clear that there are far more reasoning mistakes than any list of fallacies could highlight. It also seems clear that there are mistakes that are both more common and more central than the ones included in standard lists of fallacies. It is a critical-thinking mistake to fail to seek out relevant information; to ignore complexities that might arise; and to lose sight of my purpose, the question at issue I'm addressing, or the larger context in which I'm reasoning. But none of those is classified as a fallacy. Indeed, fallacies do not address steps even as basic as identifying and evaluating my assumptions. More to the point, though, teaching fallacies gives no real account of *how to think well*. It teaches only mistakes to avoid. Imagine teaching a subject such as medicine (or language arts, or science, or literary criticism) by saying, "Here are the twenty most common mistakes doctors make."

Well, OK. But how do I make an accurate diagnosis?

Approaches that Omit Standards and Elements

Some approaches leave out virtually all the crucial aspects of thinking something through. Bloom's taxonomy (Bloom et al, 1956), including its revised version, is a good example here. So is Webb's Depth of Knowledge Model (Webb, 2005). In Bloom's taxonomy of cognitive processes, here, for instance, is a standard example of a gloss on the "key words" and the "technologies" for the cognitive process *analyzing*:

Key Words: analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates

Technologies: Fishbowls, debating, questioning what happened, run a test (Anderson et al., 2001).

Bloom's approach is, I believe, intended to be what I am calling "comprehensive." It makes sense to think that analyzing, breaking something down, comparing, and the rest are cognitive processes one could use in thinking about anything.

It is hard to see how processes as disparate as *analyzing* and *inferring* could fall into the same category. But it is the lack of systematicity in these approaches that makes them of little help in practice. In the list of key words above, notice the absence of terms that refer to the *quality* of the cognitive processes in question, to *how well* the cognitive process is carried out, to what Richard calls "intellectual standards." We do not want students simply to analyze, break things down, compare and the rest. We want them to do so *accurately*. We

want them to do so in a way that is *relevant* to the issue under consideration. When they apply or compare, we want them to keep focused on the most *important* aspects of the issue (not the minor or trivial ones), and we want them to consider what *complexities* may arise as they engage in the cognitive processes. Of the over sixty items in Webb's Depth of Knowledge, only two make reference to critical-thinking standards: "*clarify*" and "develop a *logical* argument."

The absence is a serious one. Intellectual standards are missing not just from the descriptions of the cognitive processes, but also from the explanations given for them and even from the ways prescribed for teaching and assessing them in students.

Approaches such as Bloom's or Webb's also leave out the elements of thought that are really the centerpiece of metacognitive reasoning. That is, though they focus on a process such as *comparing*, they don't even consider the question of my *purpose* in comparing X with Y, or my *assumptions* as I make the comparison, or the *implications* of doing so. Without considering my *purpose*, my *assumptions*, the *implications*, etc., I can hardly be said to be thinking critically at all.

Restricted-Standards Approaches: Privileging Accuracy

Just as a critical-thinking approach can be limited in the domains to which it applies, or the piecemeal skills it highlights, an approach can also be limited in the critical-thinking standards it addresses. The previous category—approaches that omit standards almost entirely—are an extreme version of this.

Intellectual standards of the sort that Richard highlights often lie submerged beneath the surface of discourse about critical thinking. They are often not mentioned explicitly at all, and as a result both discourse about critical thinking and teaching for critical thinking

are far less comprehensive and systematic than they should be. The explicit focus on the standards is a major way to teach, develop and refine critical-thinking skills, traits of mind, and tendencies. The explicitness of that focus, moreover, adds substantially to one's ability to use critical thinking in practice. As I think through X critically (where X can again be anything), I need to ask whether I am thinking about it *accurately*; whether I am being *clear*; whether a particular idea is *relevant* to the issue at hand; whether I am being as *precise* as I need to be; whether I am thinking *deeply* enough and seeing the complexities that are likely to arise; whether I am focusing on the most *significant* aspects of X; whether I am thinking *broadly* enough and taking account of the bigger picture; whether I am thinking *logically* and consistently throughout; and whether I am being *fair* in my reasoning. In Richard's approach, all of those standards are vitally important. None of them can be omitted or ignored without seriously endangering the whole process of thinking.

Other things being equal, when an approach to critical thinking fails to explicitly target multiple key intellectual standards, it reduces its systematicity, and this has consequences for the usability of the approach in practice. It has serious implications for how critical thinking is taught, assessed, and learned. The explicitness gives me the concepts I need to focus on to assess how well I am thinking about X. It lays out for me the standards that my thinking needs to meet. Without explicitly focusing on the crucial standards, I am left with only such very general questions as "Am I thinking this through critically?" or "Am I thinking this through well?" But I need an awareness of the specific qualities that give my thinking *criticality*, that make the product of my thinking a *well-reasoned* one.

Though I have only impressionistic evidence for this—based on reading, working with a wide variety of instructors, working

with students, and interacting with other critical-thinking theorists—it seems clear to me that *accuracy* is far and away the most frequently targeted intellectual standard in teaching and learning. Even the most didactic teacher, one who requires students only to repeat memorized information, requires students to be accurate in the information they repeat. Though even the standard of accuracy is often not mentioned explicitly, it is there, very close to the surface. In nursing process, diagnoses are expected to be accurate ones. In scientific method, the initial hypothesis needs to be plausible, and the tests will be designed to confirm or disconfirm it. Both *plausibility* and *confirmation* are intimately connected with the standard of *accuracy*.

There is a virtual hegemony of accuracy as a standard of thinking and learning. I often find myself saying that a response is "right or wrong or somewhere in-between." I do not often find myself saying that a response is "relevant or irrelevant or somewhere in between," or that a response is "precise or imprecise or somewhere in between." "Right versus wrong" (that is, *accurate* versus *inaccurate*) springs to mind in a way the others don't. It often seems as if *all* we are looking for in learning is accuracy. We often judge whether students are *clear* by whether they are able to accurately repeat a definition, regardless of whether *they* are clear about what the definition means. Textbooks often ask students to *apply* something from the text, when what they mean is that students should repeat—repeat *accurately*—an application that the authors of the text made. Without a rich account of other standards, accuracy can—incorrectly—seem more important than the others.

In general, two other standards, relevance and clarity, are often more or less brought into instruction, sometimes even explicitly. (The legacy of formal logic, with its insistence on "logical validity," helps philosophical approaches highlight relevance.)

Clarity sometimes is highlighted in asking students to clarify a passage or an idea, or in the injunction to say something more clearly. Even here, though, very little is said about how to go about *making* something clearer. Mostly, though, relevance and clarity are just “understood” as something needed. It is *expected* that a treatment plan should be relevant to the diagnosis given; it is *expected* that the scientific test should be relevant to the hypothesis. But the standards of relevance and clarity are usually not taught explicitly, and therefore students usually do not have access to them in their own thinking as they reason through problems.

Other essential intellectual standards are often not mentioned at all, and they are rarely brought forward as aspects of thinking that need to be addressed explicitly. This is a loss. It seriously limits the systematicity—and thus the practicality—of an approach to critical thinking. When I have the main standards to guide me, I have a set of concepts that I can use to assess my own thinking and the thinking of others, about any topic. In contrast, without those standards explicitly before me, I lack such a guide to assessment.

In this section I have been cataloguing approaches to critical thinking that, I’ve argued, are only partial. They lack comprehensiveness, or systematicity, or both. They apply only within restricted domains, they leave out critical-thinking standards and maybe elements of reasoning as well, they focus on only one or two of the standards (most commonly accuracy), or they highlight only certain skills or steps of reasoning. A question that comes up with respect to any of these partial approaches is one of transferability. To what extent does learning to think critically using a restricted approach help someone acquire, develop and deepen the skills, tendencies and habits of mind needed to think critically about a larger range of issues? To what extent does learning to think in terms of Nursing Process or argumentation theory

or scientific method or problem-solving help someone become (a) more skillful at thinking through other issues (such as parenting or decision-making), and (b) more likely to engage in unprompted critical thinking when it is important to do so. It’s an open question, but it’s not one that gives rise to much optimism in me.

4. Costs and Implications

There are tensions and trade-offs in any approach to critical thinking. I’ve already mentioned one: it’s the tension between precision-of-theory versus usability-in-practice. But the main tension I want to address here is the one between specificity and flexibility. Highly specific directives in critical thinking (and probably in everything else) focus people on carrying out one well-defined task in critical thinking. A specific directive might be: “Identify the author’s main conclusion in this article.” The precision of the directive pinpoints *exactly* what I need to do.

There is a great benefit (I might almost call it a seduction) in teaching critical thinking via specific directives. The benefits come in the form of focus and an almost preternatural clarity, and in the ease with which they allow teachers to grade a student’s response. Specific directives are the lingua franca of most questions on SATs, ACTs, and course exams as well.

There are serious costs to using specific directives in teaching critical thinking. One cost, already mentioned, is the serious loss of applicability. The same factor that brings *focus* also brings a grave *limitation in scope*. The specific directive to *identify the author’s conclusion* in a passage ignores teaching students to identify their own conclusions, to compare their conclusions with those of others, to think of alternative conclusions one might draw, to evaluate conclusions the author has come to, and so forth, indefinitely.

But a second related cost is perhaps

just as great. Notice that it is *the directive* that induces the focus. It is the directive—not the student—that does the pinpointing. Thus the thinking students engage in is not something they do autonomously. It is not the result of a question they themselves ask, or try to formulate, or adapt to the specific context they are trying to think their way through. Those aspects of the critical thinking are done for them. *The directive itself* does a considerable amount of the thinking. And yet, in learning content in a course, in their other courses, in the way they understand and apply what they've learned, in their professions, in their life at large, it is this wider set of skills and tendencies that they most need: asking relevant questions, formulating them clearly, adapting their learning and their thinking to specific contexts.

In contrast to such specificity, Richard's approach (at least after 1991) is designed to be maximally flexible. He is aided in this by the concept-based nature of his articulation. I have written about this previously in this journal (Nosich, 2010), but to me this is the most trenchant and far-reaching product of Richard's originality: *concepts* are at the center of his approach, not individuated skills, not steps of reasoning, not instructions, not rules of thumb, not heuristics. Reasoning by means of concepts is inherently more flexible and widely applicable than following specific directives. A concept such as *conclusion* can be applied anywhere, to any field, to any context, to any aspect of thinking. By contrast, a specific directive that contains that concept—for example, "*Identify the author's conclusion in this passage*"—is automatically more limited than the concept itself is.

Elements, standards, traits and barriers are all put forward as concepts to be applied everywhere (though of course not all of them at any one time or in every context). Applying them judiciously helps people acquire a more generalized and transferable ability to think critically in a wider variety of settings. It also

arguably helps people acquire a more general tendency to think autonomously, to ask, formulate and answer the questions that are needed in those circumstances.

There is, though, a trade-off, a cost, to flexibility as well. Learning to think in terms of critical-thinking concepts requires developing a tolerance for ambiguity and uncertainty. Students will learn to think in terms of conclusions and addressing conclusions in a multiplicity of different ways, in different cognitive processes, in different contexts. There is no longer a well-defined structure where students can just "follow the steps."

But that uncertainty, that wide-applicability, that lack of a specific structure is what is essential outside of closely delineated classroom-activities. A nurse needs to think across-the-board in terms of the concept *safety* (or *asepsis*, or *patients' needs*, or *promoting wellness*), rather than merely in terms of specific directives to help achieve safety in this specific situation.

In the actual practice of teaching, the contrast between specificity and flexibility is not as stark as I have drawn it here. If a specific directive is chosen judiciously (for example, with respect to how *central* it is to thinking critically), it can help with flexible application. It can help even more if the teacher has students work, first, on applying the specific directive and then, second, on applying *the concepts within that directive* in other ways, to other topics, in other contexts.

Moreover, Richard himself takes steps to give guidelines that help fill in some of the specificity of the elements, standards, traits, and barriers that make up the foundations of his approach. He does this in any number of ways, for instance, by unpacking more and more specific contextualizations as in *The Thinker's Guide to Engineering Reasoning* (Paul, Niewoehner, & Elder, 2013) or *The Thinker's Guide to Clinical Reasoning*

(Hawkins, Elder, & Paul, 2010), by providing a wide variety of specific concrete examples as in how to use the elements and standards to clarify and analyze excerpts from Thoreau's *Civil Disobedience* (Paul & Elder, 2014, pp. 26-32) or how to use the elements and standards to spell out the logic of ecology (Paul & Elder, 2012b, pp. 40-41), and by suggesting specific questions that open up the foundational concepts--questions about how to make my thinking clearer, for example.

Consequences of Comprehensiveness and Systematicity: Enhancement

There is an interesting consequence of Richard's goal of articulating an approach to critical thinking that I've been calling comprehensive, systematic, and practice-oriented. To the extent that he succeeds in this, his approach can be used to enhance partial or domain-restricted approaches to critical thinking.

I claimed above that restricted-domain approaches--such as Nursing Process, scientific method, or argumentation theory--do not readily apply to other areas where critical thinking is nonetheless relevant and necessary. One category that is omitted consists of items that lie really quite outside the domain that the approach is constructed for. I have said, "Renaissance paintings, voting behavior, or Newton's Laws" as an abbreviated reference for a whole host of other "items." But we do not expect Nursing Process to help with such items.

Of course, no one puts Nursing Process forward as a way of doing critical thinking across every domain. This is not so clear for other approaches that I've included among restricted-domain approaches. Scientific method, problem-solving, and argumentation theory *are* sometimes put forward as ways of not just doing critical thinking within a restricted domain, but of doing critical thinking across-the-board. Claims to across-

the-board applicability of these approaches to critical thinking are not often made by serious researchers, and they do not often appear so much in print, but they are claims that many people make in less formal settings. Most of us have heard slogans as crude as "If you can't measure it, it doesn't exist" and claims as bizarre as "Critical thinking can't be taught." They are claims that throw many people and institutions seriously off-track. The ill-conceived administrative requirement that student-learning outcomes have to be operationally defined and/or directly measurable is a particularly discouraging example of this.

The second category of omissions is more telling. This category includes all the issues that arise when the restricted domain is embedded in real life practice. In that domain of actual practice, innumerable many situations arise that call for critical thinking of a high order, with issues that are often amorphous and inchoate, and in these situations the restricted critical-thinking approach is often of little or no help. Thus, as I have argued, the experience of being a nurse in actual practice brings up an unlimited number of questions, problems, institutions to interact with, and decisions to be made, and it is crucial for a nurse to address these items *critically*. Only a small portion will be amenable to Nursing Process.

What can a nurse use to think through those other items? Richard's approach can help dramatically with this. It *enhances* a partial approach, allowing people to address as reasonably as possible *any* of the questions, problems, situations, etc. that arise.

The same is true of scientific method and argumentation theory. Richard's approach *enhances* them. I can use scientific method as my guide to research and hypothesis-testing. But if I'm trying to figure out, for example, how to apply for grants to fund my research, Richard's approach will be invaluable.

Both elements and standards direct me explicitly to factors I may well have omitted or shortchanged. (Have I explicitly identified and responded to the *assumptions* and *points of view* of the funding agencies? Have I shown *clearly* enough what is so *significant* about my research proposal and how it is *relevant* to the *point of view* the funding agency carries.) These are, of course, thoughts that may go through my mind as part of my normal practice of writing grant-proposals. But then again, they may not. In practice I can often overlook them. I can overlook this or that standard, this or that element, trait, or barrier. The elements, standards, traits, and barriers of Richard's approach serve as a explicit guidelines that help me analyze and evaluate my thinking in any setting and about anything.

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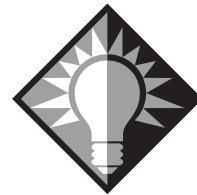
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served as Assistant Director of the Center for Critical Thinking and as a consultant for ACT in Critical Thinking and Language Arts assessment; been a consultant and evaluator for SACS; and been featured as a Noted Scholar at the University of British Columbia. He is the author of numerous articles, audio- and videotapes on critical thinking. He is a Senior Fellow and holds the Bertrand Russell Chair at the Foundation for Critical Thinking.



Author Information

Gerald Nosich is Professor Emeritus at SUNY Buffalo State College and at the University of New Orleans. He has been working in Critical Thinking since 1977. He is the author of *Reasons and Arguments* (Wadsworth, 1982). His second book, *Learning to Think Things Through: A Guide to Critical Thinking Across the Curriculum* (Prentice Hall, 2009) has been translated into Spanish, Chinese, Turkish and Arabic. He has given more than 250 workshops on all aspects of teaching for critical thinking at all levels of education, in the US, in Canada, Thailand, Lithuania, Austria, Germany, Singapore and England. He has worked with the U.S. Department of Education on a project for a National Assessment of Higher Order Thinking Skills; given teleconferences sponsored by PBS and Starlink on teaching for critical thinking within subject-matter courses;