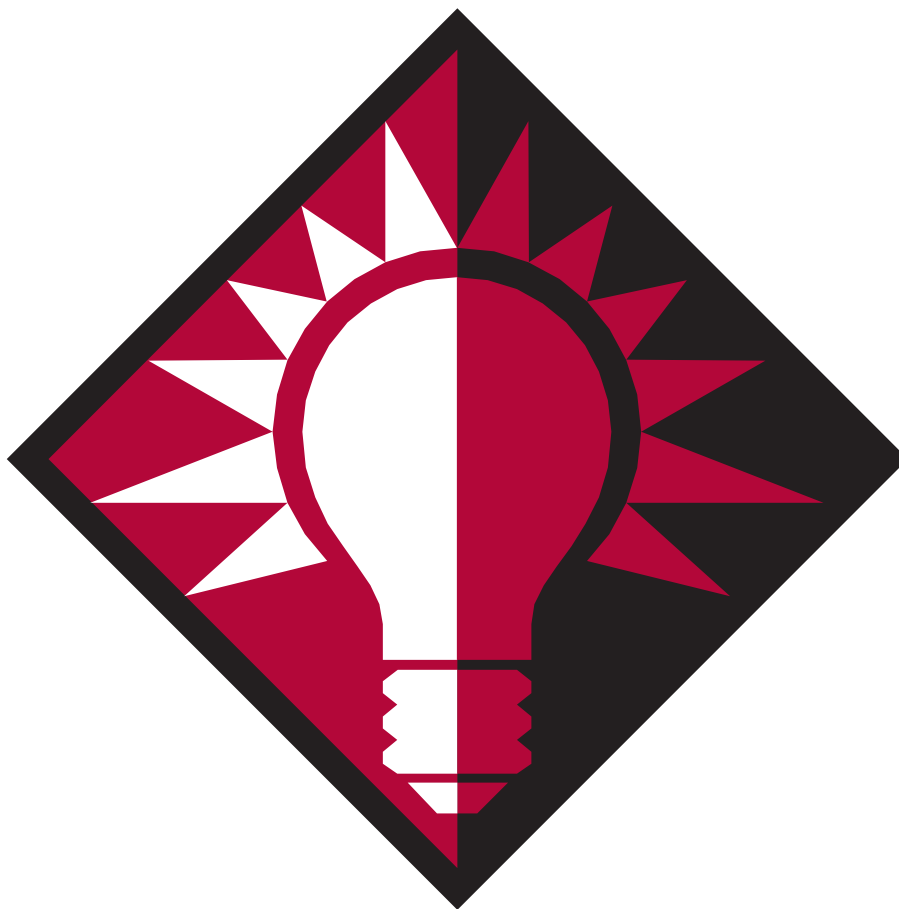


INQUIRY

CRITICAL THINKING ACROSS THE DISCIPLINES



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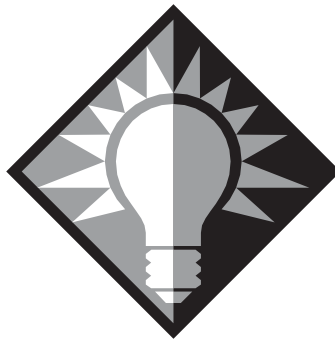


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Frank Fair, Managing Editor



From the Editor's Desk

Frank Fair

In this issue we celebrate the life and work of Richard Paul by inviting his colleagues to describe the development, meaning, and application of his influential conception of critical thinking. Two of those colleagues, Linda Elder and Gerald Nosich, are guest editors for this special memorial issue. So, without further ado, here are their introductions to the issue.

Introductions to the Memorial Issue by Guest Editors Linda Elder and Gerald Nosich

Linda Elder

I am honored to be part of this distinctive edition of *INQUIRY*, which is focused on the life and work of Richard Paul. Paul was an author, professor, advocate for justice, revolutionary for freedom, and thinker *par excellence*. And he was, in the main, like Socrates, a theoretician, philosopher in everyday life, and student of the human mind. Throughout his life of scholarship, Richard Paul pursued an insatiable desire to understand the foundations of human thought and behavior, and believed that the highest path to human enlightenment depended to a significant degree on the quality of one's reasoning abilities and one's will to develop intellectually and personally. He himself embodied confidence in reason and the questioning mind, never satisfied with answers that lacked inherent logic and reasonability, no matter from which part of society or academia they emanated, including his own field of Philosophy.

There are, as far as my understanding can tell, very few truly original thinkers in the history of ideas and of human thought. Paul is one of these rare few. It is for this reason that I have argued in my opening paper for the importance of the establishment of first principles in critical thinking based fundamentally in the theory developed by Richard Paul and Paulian scholars working in this tradition. Readers can decide for themselves whether I have made the argument clear, coherent, and transparent.

Richard Paul believed in the possibility of free and critical societies developing over the long run. And he believed virtually all humans to be capable of advancing to far higher levels of thought and of living than most will ever begin to experience in their lifetimes. He was, in his own words, at one and the same time an "idealist, a realist and a pragmatist." A few of the many powerful ways in which Paul's work has been and can be contextualized in education and professional communities are illuminated through the important contributions in this special edition. One must determine for her or himself whether it is possible, or probable, that humans will embrace the principles of critical thinking in time to save ourselves from the menacing problems we now face. I am not myself optimistic, so powerful are the forces now working against us. Still, one must not give up hope, or I fear that the whole thing will come tumbling down. And it is only through committed unwavering resolve that we can significantly advance our ability to alleviate the suffering pervasive in the world, and raise our species to higher forms of living, based in reasonability, enlightenment, and true egalitarianism.

I would like to thank the authors who have given of their time and intellectual energy to this edition, who have articulated in writing their thoughts about Paul's contributions, and who have shared their expertise with others through this sacrifice of time, all in memory of Richard Paul. I am confident that Richard would be pleased with all of the contributions to this edition, and would, on the whole, agree with our arguments and conceptual moves. He would deeply appreciate the honor to him personally represented through this special edition. He would delight in closely and carefully reading all our assertions, suggestions, concerns, issues, descriptions, victories and stumbling blocks; after closing the journal, he would pause for a long moment of deep satisfaction and quiet reflection. And then, after the knowing smile had faded, and the dusk of reality began to once again set in, mostly he would hope that people, far sooner rather than later, could and would intimately embrace the principles in a robust conception of fairminded critical thinking, for the benefit of all humans and sentient creatures.

On a personal note, it was with extreme difficulty and profound sadness that I finally made it through the process of writing my own article in this edition, so raw is the memory of the loss of Richard Paul as my husband and closest friend and colleague. Given the depth of my grief at this time and throughout the last year, it was possibly too soon for me to try to attempt such an important piece. But it is my way to ask too much of myself, something Richard consistently warned me against. It seems to me that an essential gift we give to those who go before us is to continue living, appreciating and enjoying life to the utmost in the very moment of living, and to keep living at the highest levels, while we still have the gift of life, and even when we experience profound grief. Richard himself embodied this principle every day of his life during the time I knew him; he would expect nothing less from me at this time. For Richard, sadness and grief would need to take a back seat to pragmatic reality and the good that can be done through our efforts today. This understanding did help in impelling me onward to the finish line of my contribution, however much I would have liked to succumb to the real and debilitating effects that have been implicit in losing Richard as my intimate partner, after more than 20 years of marital love; this, I now entirely understand, is the price of love. And it is a price I pay, though not gladly.

I want to thank Frank Fair, Editor of *INQUIRY*, for his ready willingness to work with Gerald Nosich and me when we approached him with the idea of this special edition. He has been a delight to work with throughout the process.

Finally, I want to thank my colleague and very good friend Gerald Nosich for the primary role he played in working with the authors in this edition, to smooth over the rough edges and fine tune our contributions. Gerald and I were both dealt a tremendous personal blow through the loss of our closest colleague and constant friend when Richard died. A rare few understood something of the intimate workings of Richard's mind, and hence can begin to conceptualize the loss that Richard's death represents to the advancement of ideas. Gerald was one of those rare few. I want to thank Gerald for his continual reminder to me that our grief is normal, and that we will get through it; it seems by all evidence before us that he is right and that now, more than a year after Richard's death, the fog is beginning to lift. Thank you, Gerald, for your unwavering support of me personally during this difficult time.

Living with so magnificent a thinker as was Richard Paul has made me appreciate the power and theoretical ability of the human mind. Experiencing Richard's mind at play and at work over many years has helped me conceptualize the intellectual possibilities for the human

species, so highly disciplined was he as a reasoner. But it has also drawn for me in stark relief the distance between highly skilled thinkers and most other people, so far are “normal” humans from realizing anything like the level of intellectual discipline that people like Richard routinely cultivate in their thought and action and the intellectual virtues they embody.

What Richard would wish is for us to comprehend with deep understanding the accessibility of critical thinking for all persons in every part of human societies, and he would compel us to take foundational consistent steps in precisely that direction as soon as is humanly possible.

Gerald Nosich

Richard and I were friends and colleagues for more than 35 years. He was a close friend. I carry a deep sense of appreciation for this memorial issue of *INQUIRY* and an abiding gratitude for the privilege of co-editing this issue dedicated to him and his work.

Linda Elder and I invited contributions to this issue with an eye both to honoring Richard as a person and to displaying some part of the wide range of ways Richard’s work has shaped educational practice. Hundreds of thousands of educators in a growing international community now incorporate Richard’s work, in whole or in part, into their teaching and their practice. For Richard himself, the directionality of his work was always toward developing fairminded, substantive critical thinking, and, ultimately, in the service of furthering the creation of fairminded critical societies.

In this issue, Richard, the person, comes through most vividly in the paper by Linda Elder. But a sense of him also comes through in my paper and, in a somewhat different light, in Donald Hatcher’s. In that paper Don describes Richard’s personal stewardship of “the Critical Thinking Movement” “of the 80s and 90s, and the profound personal influence he had on Don and others in that “first generation” of critical-thinking scholars.

But, as those who knew him well can attest, Richard the person was not really separable from critical thinking or from his work on critical thinking. It permeated and flowed through his whole life and all his pursuits. All the papers in this issue address Richard’s work.

Both Linda’s paper and my own address Richard’s work as an organic, integrated whole. Linda lays out what came to be called “the Paul-Elder approach,” but she also describes many of the lesser-known aspects of Richard’s work in critical thinking. She also argues for the importance of creating a field of critical-thinking studies, one that is distinct from and not under the control of any other academic discipline or department. The creation of such a field was always dear to Richard’s heart, though he (like Linda) was skeptical that such a field could, given the political realities of colleges and universities, actually be brought into existence.

In my paper, I describe what Richard was trying to achieve overall, his focus on articulating a comprehensive and systematic approach that would help people, as he so often said, take control of their learning and their life. Richard’s most developed work after 1991 was designed expressly to apply, in a straightforward way, to thinking about *anything*, and to address all aspects of critical thinking usable in practice. A consequence of this is that Richard’s approach can be used in any context and can enhance more specialized ways of engaging in critical thinking, either in pedagogy or in practice.

Such contextualization and enhancement are shown vividly in the next two papers in this issue. Amanda Hiner's paper shows Richard's work being brought to and shaping her courses in writing. And Robert Niewoehner's paper brings Richard's work to both the teaching of engineering and to the practice of engineering by professionals.

Two rich individual areas of study: writing and engineering. As different as writing courses are from courses in engineering, the contextualizations that Amanda and Rob construct are strikingly similar. That deep similarity derives from the integrity and flexibility of Richard's approach. It is an approach, as each author exemplifies, that provides a template for building an entire course or field of study around critical thinking. Amanda and Rob also show how Richard's framework serves as a model for structuring not just pedagogy, but practice. In this case it is the lifelong practice of writing and the career-shaping practice of being a professional engineer.

Amanda's paper is written in the elegant prose of someone who deeply values fine writing. She describes the way she re-designs and re-thinks her lessons, her syllabus, her learning-outcomes, her assessments—virtually everything in fact—bringing in the intellectual virtues, intellectual standards and the elements of reasoning. It is clear, in reading her article, that her re-conceptualized course is a transformative one. She shows us her students as they gain new insight into the egocentrism inherent in confirmation bias and cognitive dissonance, and she shows us the empowerment they gain from that insight. To me, her recounting of her students' experiences was wonderfully uplifting. Perhaps even more moving, for me at least, was the transformation she herself experienced.

Rob's paper, by comparison, is quintessentially that of an engineer. The paper would be gratifying to Richard because his abiding goal was for critical thinking to be contextualized to all fields of inquiry, and Rob was one of the first co-authors of a *Thinker's Guide* specifically adapted to a particular field or area. In Rob's paper he lays out the way he "portaged" Richard's work into his teaching and practice. He describes the *Guide* he co-wrote with Richard and Linda, and how he then used that *Guide* to shape both his courses and his presentations to professional engineers. He shows how Richard's approach both underlies and enhances standard models for conducting business and engineering. Most invigorating for me, though, are the vivid examples he gives of the use (or misuse, or lack of use) of critical-thinking principles in engineering-related practice.

Contextualizations as thorough-going as Hiner's and Niewoehner's require someone as committed and thoughtful as Amanda and Rob to carry them out and adapt them to the specifics and the rigors of their respective subject matters, but the framework for doing so is there in Richard's approach. The ways Hiner and Niewoehner adapt that framework to their own specific courses and practice can, in turn, be models for other instructors, in other fields, at any level of education, or in any life-practice.

Donald Hatcher does something different. He shows in his paper how Richard's work is part of a tradition of humanistic philosophy, philosophy that is centered on how best to live one's life. Don's appreciation is heavily centered on the rich theme of ethics that is omnipresent in Richard's work and on the intellectual virtues that Richard saw as the necessary foundation for engaging in authentic strong-sense critical thinking. Don also shows us a Richard Paul who brought together and nurtured "the critical-thinking movement," bringing together at his yearly International Conference virtually every one of the first-generation of critical-thinking scholars.

Don's paper, characteristically for him, is carefully argued, imbued with the history of humanistic philosophy, exhilaratingly literate, and open-hearted in its appreciation for Richard and his work. To me, there is a spirit of nobility to the way he situates Richard's work within the grand tradition of perennial philosophy. As guest editor, and as Richard's friend, it was a pleasure to read it and to communicate with Don about it.

The final paper in this issue is the one by Patricia Payette and Edna Ross. In their paper they describe the contextualization of the Paul-Elder approach to two seemingly very different domains within a university. They address the domain of pedagogy: promoting the incorporation of critical thinking into the teaching of courses across the curriculum. But they also address the domain of professional staff: tutoring, advising, and helping students develop necessary library-skills.

With respect to the pedagogical domain, Patty and Edna describe the innovative strategies they used to bring the Paul-Elder approach to pedagogy across disciplines. Payette and Ross do not discuss the challenges they encountered in bringing such a program to bear at the University of Louisville, but, in my view, a large research university, with its abundance of independent academic departments and schools, many with radically different pedagogical traditions, is perhaps the most difficult venue for an integrated, organic program of teaching to take root. To me, the success that Patty and Edna have had, and continue to have, is inspirational.

In a significantly different vein, though, they bring in another rich set of applications of Richard's work, this time by professional staff. This is the work of tutoring students, of collaborating with students for effective advisement, and of helping students learn how to make substantive, thoughtful use of library resources. Infusing critical thinking into these three endeavors faces significantly greater challenges than those that obtain in pedagogy. In regular scheduled courses, instructors have the opportunity to teach critical-thinking concepts and reinforce their use by students over the course of a full semester. They also have the considerable motivational advantage of giving grades: assessments in a classroom can be made to hinge directly on students' ability to use critical-thinking concepts and tools to think through the subject matter of the course. By contrast, in tutoring, in advising, and in library-based research, professional staff meet with students much more sporadically, for a far more limited amount of time, in less circumscribed conditions, and without the motivation that comes with the power to give formal grades. Yet in all three areas, students make choices and engage in learning in ways that affect their whole experience in higher education as well as in their careers after graduation. The challenges facing professional staff in fostering the critical thinking that is essential for students' success in college and thereafter are formidable. Payette and Ross describe the impressive way professionals in these three areas have changed the substance of academic student service in the direction of critical thinking. In so doing, though, they give yet another usable template for how the Paul-Elder model can be used to transform large-scale practice at any major research university.

Acknowledgement from Linda and Gerald

Linda and Gerald want to express their appreciation to the scholars who contributed to this memorial issue of *INQUIRY* dedicated to Richard Paul and his work. Our hope is that the papers in this issue may have a positive impact on advancing critical education and practice, and, over time, moving us toward the creation of critical societies.

Richard Paul's Contributions to the Field of Critical Thinking Studies and to the Establishment of First Principles in Critical Thinking

by Linda Elder

Abstract

Beginning in his PhD program, and over a period of years in the 1960s, Richard Paul thoughtfully examined and deliberately critiqued existing theories of logic and reasoning. This laid the foundation for what was to become a long and splendid career of scholarship, culminating in the reconstruction and enrichment of the theory of logic, of reasoning, and of critical reasoning. Paul took what was a very narrow conception of reasoning (still used widely among philosophers today), and broadened it to more accurately represent what in fact happens in human thinking when people reason. He captured the idea of universal intellectual standards by exploring standards typically used by skilled reasoners, and then assembling these standards into a constellation of ideas easily understandable by scholars attempting to reason at the highest levels within their fields, as well as by everyday persons. Recognizing the importance of placing ethics at the heart of a substantive conception of critical thinking, Paul cultivated and extensively developed the theory of intellectual virtues; early on Paul distinguished between what he termed strong sense (or ethical) critical thinking and weak sense (or unethical) critical thinking, and staunchly advocated for fostering critical thinking in the strong sense -- in education and throughout society. Paul realized that, without intervention in egocentric and sociocentric tendencies, the mind was likely to miss pathologies in thinking. He revolutionized our conceptions of reasoning, of critical reasoning and of logic, and called into question both historical and contemporary conceptions of philosophy itself. Paul made it clear that neither metaphysics, nor formal logic, nor mathematical reasoning, nor informal logic, nor argumentation, nor any other individual subject could ever adequately guide the human mind through the myriad complexities it faces in dealing with the difficult problems of real life. Following the tradition of Socrates, Paul continually emphasized the importance of developing deep conceptual understandings based in foundational ideas and principles of analysis and critique and tested through the real living of one's life. Paul's work laid the groundwork for what may be termed first principles in critical thinking and for a legitimate field of critical thinking studies, a field which has yet to emerge due to a number of complex academic, social, and political barriers.

Keywords: critical thinking, Richard Paul, critical thinking studies, Philosophy, critical societies, egocentricity, sociocentricity

I. Introduction

Richard Paul died in the fall of 2015. It is safe to say that during his life Paul contributed more to the development of the explicit concept and theory of critical thinking than any person living or dead. This article, a tribute to the life and work of Richard Paul, outlines only briefly the rich philosophy of

critical thinking Paul developed over many years of thinking about reasoning, most especially *critical reasoning*. It was my tremendous fortune to have the rare chance to work with Richard Paul very closely, and indeed intimately, over more than 20 years. Throughout this time, almost all of our publications were written together. Therefore, writing this piece has been particularly

difficult, since I know he will never have the chance to read it, critique it (with great skill and vigor), and illuminate areas for improvement, which was always his way. Yet, though this piece was difficult for me to get through personally, and though the ideas within it may be only succinctly developed in the short space allowed, I am deeply honored to contribute my thoughts to this important collection of articles recognizing the erudition and scholarship of such a distinguished thinker as Richard Paul. In this article I will focus on the following:

1. Richard Paul's conception of critical thinking, which developed over half a century of research and scholarship in critical thinking – a conception that chiefly unraveled reasoning itself, revolutionizing our most basic theory of both reasoning and *critical* reasoning, and systematizing the use of critical thinking across academic and professional fields of study.
2. First Principles in Critical Thinking developed and established by Richard Paul.
3. A few of Paul's significant contributions to critical thinking that are less understood and hence less appreciated than those aspects of the theory considered primary in his work.
4. The importance of establishing a *bona fide* field of Critical Thinking Studies to remove critical thinking from the control of the field of philosophy and other academic and professional fields that have laid claim to it (or will in the future attempt to lay claim to it) and the importance of the field to the development of the conceptual underpinnings of critical thinking, as well as to its theoretical development and contextualization.
5. Some major barriers to the

development of a field of Critical Thinking Studies.

6. Intrinsic problems in systematizing the use of Richard Paul's approach to critical thinking within and among academic and professional subjects, as well as across human societies.
7. Where Richard Paul may have been wrong, possibly by overestimating the degree to which people are ultimately capable of cultivating critical societies.

II. How Richard Paul Revolutionized Our Understanding of Reasoning, Critical Reasoning, and Logic – Some Historical Notes

To begin with some brief historical perspective on Richard Paul's thinking, it is interesting to note that his most significant personal notes and recorded thoughts on reasoning and logic date back to the mid 1960s, culminating in his two dissertations, the second of which was accepted as his final dissertation for the PhD in philosophy. In this dissertation, published in 1968, Paul begins the explicit critique of logic and reasoning that was to remain at the center of his life's work. In this doctoral dissertation, *Logic as Theory of Validation: an Essay in Philosophical Logic*, Paul critiques traditional approaches to logic and argues for an approach to reasoning based in natural languages. He begins to address the following questions among others (Paul, 1968):

- To what extent is it the task of the logician to examine "the logic of language" as people use language in everyday life?
- To what extent should the logician be a linguistic analyst?
- To what extent is the philosopher's

conception of “logic” in keeping with ordinary uses of the term (by ordinary people living their lives)?

- How does it make sense to best conceptualize the analysis of reasoning?
- How does it make sense to best conceptualize the assessment of reasoning?

In this dissertation, Paul lays the groundwork for what will come to be known more than two decades later as Paul’s *elements of reasoning* and *universal intellectual standards*. In this early work, Paul critiques given conceptions of logic used and advanced by traditional philosophers, pointing up assumed philosophic views of logic as woefully inadequate, and hence not in keeping with natural uses of language by people in every day life. Paul’s even earlier unpublished dissertation attempts to establish the importance of developing a systematic approach for dealing with the many types of questions humans must address and work through in human life. In this dissertation, Paul begins to detail and pursue a systematic method for unpacking, or deconstructing, the logic of questions. Interestingly, according to Paul, this dissertation was not approved by Paul’s dissertation committee, as it was considered by the committee to be “too original.” (This information was given to me in conversation with Paul. Paul’s unpublished dissertation is in the library of the Foundation for Critical Thinking).

In his 1968 published dissertation, Paul is concerned to understand, analyze and evaluate traditional views of reasoning and logic, for a richer and more useful conception of both. Paul defends the following claims, among others:

1. “that the matter/form distinction will not do as a means of accounting for the

subject matter of logic” (p. iv).

2. “that the concept of validation-conditions for assertions and settlement-conditions for questions *will do* as a means of accounting for the subject matter of logic” (p. iv).
3. “that if logic is concerned to develop tools for the evaluation of reasoning and if reasoning consists in the attempt to support, justify, substantiate, or validate a claim by advancing evidence which bears upon that claim, then a) the truth/validity distinction and b) the deductive/inductive reasoning distinctions are misleading and oversimplified dichotomies which stand in the way, rather than facilitate, the development of tools for the valuation of reason” (p. v).
4. “that the task of the logician (in so far as logic is concerned to develop tools for the analysis and evaluation of reasoning) is that of explicating the area of ‘the logic of language’ which has been called ‘the logic of questions and assertions.’ ... [that] there is an intimate relationship between meaning, validation, and proof, and ... the intersection of these concepts comes in the assertion-making function of language” (p. vi).

In this early theoretical piece, Paul argues that it is impossible to separate the tasks of verifying precisely what a reasoner is claiming from that of determining what is relevant to substantiating that claim. Hence, one cannot determine whether evidence advanced in support of a claim is relevant and complete until one is clear as to what is relevant to the claim itself, in other words, until one “is clear as to the validation–conditions of the claim at issue (p. vi).”

Though in his later, more advanced work, Paul rarely referred to validation—conditions for assertions and settlement—conditions for questions (as organizers for reasoning), we can see very clearly in this dissertation foundational conceptions he was clarifying in his own thinking, which enabled him, as his thinking developed, to move forward to a more basic and more useful conception of valid reasoning and to a concept of logic more in keeping with both educated and everyday usage.

A rich concept of logic continued to play a central role in Paul's thinking to the end of his life, and was the focus of his early article entitled "Background Logic, Critical Thinking, and Irrational Language Games" (1985). In this article, Paul details reasoning in such a way as to show that a simplistic, formulaic approach to reasoning, and the cultivation of reasoning, will not suffice. He argues that, when philosophers moved away from a Socratic orientation and perspective, instead choosing to reduce reasoning to formulas and simple procedures, a significantly wrong turn was taken in the history of philosophy and the history of ideas, resulting in long-term negative implications for the central ways in which reasoning is understood.

In this seminal article on the concept of background logic, Paul argues that reasoning entails many complexities which must be taken into account if one is to understand reasoning -- for instance, reasoning entails multiple logics, some of which may be in conflict and many of which lie at the unconscious level of our thought. To understand reasoning, both our own and that of others, we must become skilled at analyzing the depths of human thought. We must have a rich understanding of the meanings that lie beneath the surface of our thought, especially the meanings we would rather keep concealed. We must be able to open up and examine the logics functioning and interacting unconsciously in the mind -- to

see how they are influencing our thought, to determine where correction is needed, and to locate hidden pathologies in thought.

In his critique of traditional philosophical approaches to reasoning, in the dissertation, and in later articles and publications Paul illuminated the conflicting nature of these approaches, as well as the limitations and often glaring inconsistencies and incompatibilities within and among them. Over time, Paul developed a clearer and more distinct sense of the importance of replacing fragmented, inconsistent, and conflicting philosophical approaches to reasoning with an integrated, systematic approach applicable across human reasoning.

As we see revealed in his published 1968 dissertation, Paul believed the primary task of the logician to be the development of ideas for analyzing and assessing reasoning in every discipline and domain of human thought -- tools to be used in reasoning through life's many complex problems and issues. He emphasized the importance of the "logic of language" to human reasoning (incorporating Wittgenstein's view on language as fundamentally connected with *usage* in everyday life, rather than relying on esoteric theories of meaning). He set forth the notion that every subject and discipline entails a fundamental logic that can and should be explicitly formulated (and for which an adequate theory of reasoning must provide the foundation).

Scholars of Richard Paul's thinking should see from this brief historical outline that Paul's focus on the importance of explicating intellectual tools for analyzing and assessing reasoning in his 1968 dissertation, and his emphasis on understanding logic and its proper role in human thought, lay the groundwork for what would become his life's work.

III. Paul's Conception of Critical Thinking and its Connection with Other Core Definitions of Critical Thinking

Throughout the 1970s, 80s, 90s and beyond, Richard Paul's conception of critical thinking continued to develop and deepen. He applied critical thinking concepts in his own classroom as a university professor over more than 30 years and in his extensive work in teaching instructors at all levels how to foster critical thinking in their own classrooms.

Throughout his research and scholarship in critical thinking, expanding over half a century, Paul consistently argued that no individual definition could possibly capture all the important and essential ingredients of a rich conception of critical thinking (in the same way that no single definition can capture a robust conception of science, or psychology, or anthropology, or indeed any complex field of study). Paul believed that the concept of critical thinking can and should be articulated in many overlapping ways, both fundamental and complex. For Paul, the most basic insight into critical thinking lies in understanding that because humans cannot be trusted to reason clearly, logically, reasonably, or deeply, we need explicit conceptual tools for intervening in our thinking, for assessing it, and where necessary or useful, for improving it.

Paul founded the National Council for Excellence in Critical Thinking under the auspices of the Center for Critical Thinking and Moral Critique and the Foundation for Critical Thinking to expand critical thinking principles across educational institutions the U.S. during the late 1980s and early 1990s. In 1987 Richard Paul and Michael Scriven (Scriven and Paul, 1987) crafted the following definition of critical thinking for the National Council:

Critical thinking is the intellectually

disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.

It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue; assumptions; concepts; empirical grounding; reasoning leading to conclusions; implications and consequences; objections from alternative viewpoints; and frame of reference. Critical thinking — in being responsive to variable subject matter, issues, and purposes — is incorporated in a family of interwoven modes of thinking, among them: scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking.

Critical thinking can be seen as having two components: 1) a set of information and belief generating and processing skills, and 2) the habit, based on intellectual commitment, of using those skills to guide behavior. It is thus to be contrasted with: 1) the mere acquisition and retention of information alone, because it involves a particular way in which information is sought and treated; 2) the mere possession of a set of skills, because it involves the continual use of them; and 3) the mere

use of those skills (“as an exercise”) without acceptance of their results.

Critical thinking varies according to the motivation underlying it. When grounded in selfish motives, it is often manifested in the skillful manipulation of ideas in service of one’s own, or one’s groups’, vested interest. As such it is typically intellectually flawed, however pragmatically successful it might be. When grounded in fairmindedness and intellectual integrity, it is typically of a higher order intellectually, though subject to the charge of “idealism” by those habituated to its selfish use.

Critical thinking of any kind is never universal in any individual; everyone is subject to episodes of undisciplined or irrational thought. Its quality is therefore typically a matter of degree and dependent on, among other things, the quality and depth of experience in a given domain of thinking or with respect to a particular class of questions. No one is a critical thinker through-and-through, but only to such-and-such a degree, with such-and-such insights and blind spots, subject to such-and-such tendencies towards self-delusion. For this reason, the development of critical thinking skills and dispositions is a life-long endeavor.

Though a given definition of critical thinking will naturally be limited, the Paul and Scriven definition goes a long way toward capturing the key variables in a robust conception of critical thinking, a conception which could conceivably spread across human societies, should humans ever collectively achieve the will, and the understandings, required for advancing fairminded critical societies.

Richard Paul plausibly articulated the concept of critical thinking in more ways than any other theoretician living or deceased, for he articulated it in scores of published articles, books, thinkers’ guides, and essays, as well as in private notes and diagrams written throughout his many decades of thinking about thinking, about the logic of thinking, and about disciplined reasoning. It seems clear that Paul’s articulation of the concept and theory of critical thinking, taking into account its details and particulars, intimately links with all, or virtually all, other legitimate theory on critical thinking extant.

A. Edward Glaser

For instance, an extensive consideration of the literature on critical thinking reveals similar overlapping definitions and conceptions of critical thinking (Esterle & Cluman, 1993; Mosely et. al 2005; Paul & Elder 1997). An early use of the term “critical thinking” may be traced to the first methodologically disciplined study of critical thinking, conducted in 1941 by Edward Glaser and reported in *An Experiment in the Development of Critical Thinking*. Glaser’s conception, rich in details, unites with Paul’s conception, and hence emphasizes foundations in thinking:

[critical thinking] . . . calls for persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends [It] requires ability to recognize problems, to find workable means for meeting those problems, to gather and marshal pertinent information, to recognize unstated assumptions and values, to comprehend and use language with accuracy, clarity, and discrimination, to interpret data, to appraise evidence and evaluate arguments, to recognize the existence (or non-existence) of logical

relationships . . . to draw warranted conclusions and generalizations at which one arrives, to reconstruct one's patterns of beliefs on the basis of wider experience, and to render accurate judgments about specific thinking and qualities in everyday life. (Glaser, pp. 5-6)

B. Robert Ennis

Paul's conception encompasses and goes considerably beyond Robert Ennis's definition: "critical thinking is a process, the goal of which is to make reasonable decisions about what to believe and what to do" (Ennis, 1996). Ennis contends that critical thinkers are disposed to:

- seriously consider points of view other than their own.
- endorse a position to the extent that, but only to the extent that, it is justified by the information available.
- determine, and maintain focus on, the conclusion or question.
- be reflectively aware of their own basic beliefs.
- discover and listen to other's views and reasons.
- know the reasons offered in support of a conclusion and decide whether the reasons are acceptable before making a final judgment about an argument.

C. Harvey Siegel

Similarly, Paul's conception of critical thinking links with, and indeed encompasses, that of Harvey Siegel. Siegel (1988) defines critical thinking as "thinking that is appropriately moved by reasons." He contends that those with the "critical spirit," possess -- in addition to skills and abilities -- dispositions or habits of mind. Finally, Siegel says this:

one who has the critical attitude has a certain character as well as certain skills: a character which is inclined

to seek, and to base judgment and action upon, reasoning; which rejects partiality and arbitrariness; which is committed to the objective evaluation of relevant evidence; and which values such aspects of critical thinking as intellectual honesty, justice to evidence, sympathetic and impartial consideration of interests, objectivity, and impartiality.

In explaining the term "critical thinking," Paul often referred to its etymological roots, for example when he says:

The intellectual roots of critical thinking are as ancient as its etymology, traceable, ultimately, to the teaching practice and vision of Socrates 2,500 years ago who discovered by a method of probing questioning that people could not rationally justify their confident claims to knowledge. Confused meanings, inadequate evidence, or self-contradictory beliefs often lurked beneath smooth but largely empty rhetoric. Socrates established the fact that one cannot depend upon those in "authority" to have sound knowledge and insight. He demonstrated that persons may have power and high position and yet be deeply confused and irrational. He established the importance of asking deep questions that probe profoundly into thinking before we accept ideas as worthy of belief (Paul, Elder & Bartell, 1997, p. 8)

Because the human mind is capable of operating in any number of pathological ways, Paul insisted that humans should systematically intercede in thought with the best tools for intervention, practically speaking. To do this, Paul believed humans must understand how the mind works, where it tends to go wrong, and how it can be

transformed through the deliberate use of intellectual concepts and principles.

In sum, Paul's theory of critical thinking is basic and fundamental; it interlaces with all reasonable conceptions of critical thinking extant. In other words, all authoritative conceptions of critical thinking, if carefully examined, reveal similar interrelated components, or at least highlight one or more essential features of Paul's concept of critical thinking. None of these main concepts negates the essential components of the others; all assume human thought to be often problematic or even pathological. All illuminate the need for cultivating disciplined, critical reasoning across human societies.

IV. Richard Paul's Seminal Contributions to Critical Thinking

Though an academic field of Critical Thinking Studies has yet to be established, it is my view that Richard Paul's contributions to the theory and application of critical thinking will be central to any future *bona fide* field of critical thinking studies. In research in the field, in critical reviews of his work, in instructional and daily application, students, researchers, faculty, scholars, and analysts have tended to focus on the following of Paul's many central contributions to the field of critical thinking in addition to the Paul-Scriven definition.

A. The Elements of Reasoning

Paul's analysis of reasoning, which deconstructs reasoning into eight indispensable structures, or parts, fundamentally transformed not only our conception of critical thinking, but of reasoning itself. After years of research, study, and deliberation Paul ultimately narrowed down the parts of one's reasoning to these essential elements: *purpose, question, information, inferences, assumptions, concepts, inferences, and point of view*. (See figure 1). Paul's concept of reasoning enables us to

deal explicitly with the many complexities found in human reasoning. Again, Paul's conception richly expands reasoning beyond traditional anemic philosophical emphases on premises and conclusions in reasoning, on the narrow standard of validity in reasoning, on philosophical argumentation *as* critical thinking, and on fallacy theory *as* critical thinking. Decades after its conception, this richer idea of reasoning has yet to gain acceptance in mainstream philosophical societies and philosophical academic communities; formal logic as well as metaphysics still pervade the field of philosophy, impeding the development of the field of critical thinking studies, and hence of philosophy itself – assuming that philosophy is tasked with helping people *live the examined life*, as Socrates insisted (Paul, 2011)

Here is a sentence that summarizes the elements:

Whenever we think, we think for a purpose within a point of view based on assumptions which lead to implications and consequences, and we use data, facts, and experiences to make inferences and judgments which are based on concepts and theories in order to answer a question or solve a problem.

There is then a set of questions that relate to the elements:

1. What is my fundamental *purpose*?
2. What is my *point of view* with respect to the issue?
3. What *assumptions* am I using in my reasoning?
4. What are the *implications* of my reasoning (if I am correct)?
5. What *information* do I need to answer my question?
6. What are my most fundamental

inferences or conclusions?

7. What is the most basic *concept* in the question?
8. What is the key *question* I am trying to answer?

These elements can be summarized and expanded upon in a diagram such as this one:

All Thinking is Defined by the Eight Elements that Make It Up

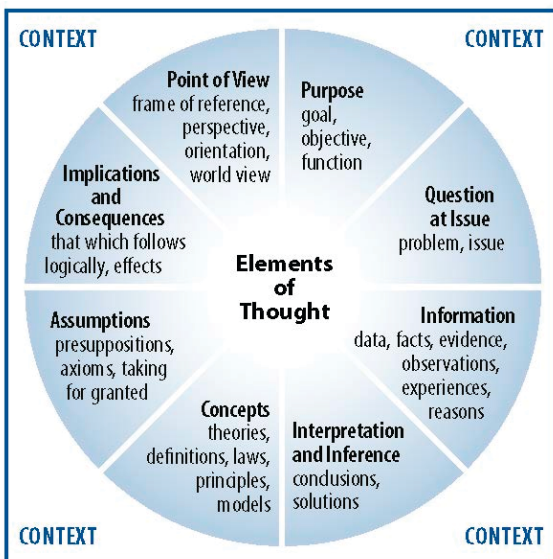


Figure 1 (Elder & Paul, 2012)

Similarly, Paul's concept of critical thinking disabuses us of the notion that scientific reasoning *is to be equated with* critical thinking, or that the study of rhetoric *is the same thing as* critical thinking, or that communications courses *naturally entail* critical thinking, or that indeed any subject *is itself* critical thinking.

B. The Universal Standards

In connection with the elements of reasoning, or structures of thought, which clarified, expanded and greatly enhanced our conception of reasoning, Richard Paul

also conceptualized, for the first time in a systematic way, *criteria* for thought -- standards used to assess reasoning within any domain of human thought by persons reasoning at high levels of quality. Again, Paul ultimately came to refer to these criteria predominantly as *universal intellectual standards* (ultimately modified from his original term *perfections of thought*.)

Reasonable people internalize these standards and explicitly use them in their thinking. When they do, their thinking becomes better because it is more *clear*, more *accurate*, more *precise*, more *relevant*, *deeper*, *broader*, more *logical*, more *significant*, and more *fair*. This section will elaborate on these nine standards with a brief description and associated questions for each one, but it should be acknowledged that this is not a complete list and that there are other standards such as credibility and practicality that could be added.

1. **Clarity**: understandable, the meaning can be grasped

Could you elaborate further?

Could you give me an example?

Could you illustrate what you mean?

2. **Accuracy**: free from errors or distortions, true

How could we check on that?

How could we find out if that is true?

How could we verify or test that?

3. **Precision**: exact to the necessary level of detail

Could you be more specific?

Could you give me more details?

- Could you be more exact?
- 4. Relevance:** relating to the matter at hand
- How does that relate to the problem?
- How does that bear on the question? How does that help us with the issue?
- 5. Depth:** containing complexities and multiple interrelationships
- What factors make this a difficult problem?
- What are some of the complexities of this question?
- What are some of the difficulties that we need to deal with?
- 6. Breadth:** encompassing multiple viewpoints
- Do we need to look at this from another perspective?
- Do we need to consider another point of view?
- Do we need to look at this in other ways?
- 7. Logic:** the parts make sense together, no contradictions
- Does this all make sense together?
- Does your first paragraph fit in with your last?
- Does what you say follow from the evidence?
- 8. Significance:** focusing on the important, not trivial
- Is this the most important problem to consider?

Is this the central idea to focus on?

Which of these facts are more important?

9. Fairness: justifiable, not self-serving or one-sided

Do I have any vested interest in this issue?

Am I sympathetically representing the viewpoints of others?

C. Strong Sense Critical Thinking versus Weak Sense Critical Thinking

One of the more pointed parts of Paul’s conception of critical thinking was an insistence on distinguishing critical thinking in the *strong sense* from critical thinking in the *weak sense*. The point is that one could be a thinker with formidable intellectual skills but still not be a critical thinker in an authentic way. Here is the contrast Paul insisted on:

1. Strong Sense Critical Thinking

- Is impartial, unprejudiced, multi-sided, empathic, non-parochial, intellectually unlimited, fairminded,
- Uses intellectual ability in the service of objective, dispassionate truth, exhibits the ability and disposition to approach all views empathically, without vested interests or favoritism,
- Has a commitment to view events or phenomena as separate from one’s self and thus to be judged as they are, without reference to one’s personal feelings, prejudices, opinions or the like,
- And to do so in ways that go beyond “finesse,” beyond clever argument, emotional appeals, beyond smooth, seductive and beguiling uses of language; committed to the fair treatment of all, especially the

unsophisticated and the vulnerable.

2. **Weak Sense Critical Thinking**

- Is partial, prejudiced, one-sided, egocentric, sociocentric, intellectually limited, parochial, selfish,
- Uses intellectual ability primarily in the service of one's selfish interest or advantage (or the interest and advantage of one's group, religion, culture, nation, gender),
- Has a pronounced disposition to view events or phenomena as they relate to one's vested interest and, thus, to judge things in the light of one's feelings, prejudices, opinions, or the like,
- And to do so in a clever, "effective" way—showing a high degree of practical intelligence and skill in contrivance, often mentally quick, cunning, shrewd; skilled in manipulating the unsophisticated and vulnerable.

As one can readily see, the distinction between the two kinds of critical thinkers is essentially an ethical distinction based on the aims and the manner in which critical thinking skills are employed. This distinction dovetails with the next component of Paul's conception of critical thinking, namely, the intellectual virtues.

D. The Intellectual Virtues

An important part of Paul's overall conception of critical thinking is that to be a critical thinker one must display a healthy measure of the valuable intellectual traits that are the intellectual virtues. While others theorists have often focused on one or the other intellectual virtue, such as autonomy or courage or humility, Paul aimed to include a much broader array of traits of character needed to be a genuine critical thinker in the strong sense. From the Critical Thinking

Community website, here is a list with accompanying descriptions:

1. **Intellectual Humility:** Having a consciousness of the limits of one's knowledge, including a sensitivity to circumstances in which one's native egocentrism is likely to function self-deceptively; sensitivity to bias, prejudice and limitations of one's viewpoint. Intellectual humility depends on recognizing that one should not claim more than one actually knows. It does not imply spinelessness or submissiveness. It implies the lack of intellectual pretentiousness, boastfulness, or conceit, combined with insight into the logical foundations, or lack of such foundations, of one's beliefs.
2. **Intellectual Courage:** Having a consciousness of the need to face and fairly address ideas, beliefs or viewpoints toward which we have strong negative emotions and to which we have not given a serious hearing. This courage is connected with the recognition that ideas considered dangerous or absurd are sometimes rationally justified (in whole or in part) and that conclusions and beliefs inculcated in us are sometimes false or misleading. To determine for ourselves which is which, we must not passively and uncritically "accept" what we have "learned." Intellectual courage comes into play here, because inevitably we will come to see some truth in some ideas considered dangerous and absurd, and distortion or falsity in some ideas strongly held in our social group. We need courage to be true to our own thinking in such circumstances. The penalties for non-conformity can be severe.

3. **Intellectual Empathy:** Having a consciousness of the need to imaginatively put oneself in the place of others in order to genuinely understand them, which requires the consciousness of our egocentric tendency to identify truth with our immediate perceptions of long-standing thought or belief. This trait correlates with the ability to reconstruct accurately the viewpoints and reasoning of others and to reason from premises, assumptions, and ideas other than our own. This trait also correlates with the willingness to remember occasions when we were wrong in the past despite an intense conviction that we were right, and with the ability to imagine our being similarly deceived in a case-at-hand.
4. **Intellectual Autonomy:** Having rational control of one's beliefs, values, and inferences. The ideal of critical thinking is to learn to think for oneself, to gain command over one's thought processes. It entails a commitment to analyzing and evaluating beliefs on the basis of reason and evidence, to question when it is rational to question, to believe when it is rational to believe, and to conform when it is rational to conform.
5. **Intellectual integrity:** Recognition of the need to be true to one's own thinking; to be consistent in the intellectual standards one applies; to hold one's self to the same rigorous standards of evidence and proof to which one holds one's antagonists; to practice what one advocates for others; and to honestly admit discrepancies and inconsistencies in one's own thought and action.
6. **Intellectual Perseverance:** Having a consciousness of the need to use intellectual insights and truths in spite of difficulties, obstacles, and frustrations; firm adherence to rational principles despite the irrational opposition of others; a sense of the need to struggle with confusion and unsettled questions over an extended period of time to achieve deeper understanding or insight.
7. **Confidence in Reason:** Confidence that, in the long run, one's own higher interests and those of humankind at large will be best served by giving the freest play to reason, by encouraging people to come to their own conclusions by developing their own rational faculties; faith that, with proper encouragement and cultivation, people can learn to think for themselves, to form rational viewpoints, draw reasonable conclusions, think coherently and logically, persuade each other by reason and become reasonable persons, despite the deep-seated obstacles in the native character of the human mind and in society as we know it.
8. **Fairmindedness:** Having a consciousness of the need to treat all viewpoints alike, without reference to one's own feelings or vested interests, or the feelings or vested interests of one's friends, community or nation; implies adherence to intellectual standards without reference to one's own advantage or the advantage of one's group.

V. Paul's Contribution to First Principles in Critical Thinking

From Paul's seminal contributions to the field of critical thinking studies, we can deduce what may be termed *logical first principles in critical thinking*. Though Paul's theory of critical thinking can be detailed

according to its complexities, by narrowing in on three conceptual sets of understandings in his theory--*the elements of reasoning, universal intellectual standards, and intellectual virtues*--as Paul conceptualized, articulated, and expanded them, we find these first principles. Some of the most essential may be briefly articulated as follows:

1. All reasoning has a purpose, objective, goal or function. *Related Critical Thinking Principle:* If we are clear about our purpose, about what we are trying to accomplish or achieve, we are far more likely to achieve it than when we are not. Moreover, the pursuit of any specific purpose is justified only when the purpose is fair to all relevant persons, other sentient creatures, and/or groups. Be clear about your purpose, and be certain it is fair and justifiable in context.

2. All reasoning is an attempt to figure something out, settle some question, or solve some problem. *Related Critical Thinking Principle:* To settle a question, we must know what it is asking and how to go about answering it. In other words, for every question one might ask, there are conditions that must be met before the question can be settled. Clearly delineate these conditions as you reason through questions and problems.

3. All reasoning is based on some data, information, evidence, experience, or research. *Related Critical Thinking Principle:* Thinking can only be as sound as the information upon which it is based. Make sure the information you use when reasoning through a question is relevant to the question and is accurate.

4. All reasoning contains inferences from which we draw conclusions and give meaning to information, experiences, and situations. *Related Critical Thinking Principle:* Thinking can only be as sound as the inferences it makes (or the conclusions it

comes to). Infer only what is implied by the evidence.

5. All reasoning is based on assumptions—beliefs we take for granted. *Related Critical Thinking Principle:* Thinking can only be as sound as the assumptions (beliefs) upon which it is based. Assess assumptions for soundness and justifiability before accepting them or acting upon them.

6. All reasoning is expressed through, and shaped by, concepts, ideas, theories, principles and definitions. *Related Critical Thinking Principle:* Thinking can only be as clear, relevant, realistic, and deep as the concepts that shape it. Be aware of how your concepts shape how you interpret life's events and situations. Control the concepts that guide your thinking and your actions.

7. All reasoning leads somewhere, entails implications, and, when acted upon, has consequences. Implications may emanate in many directions from a given thought. Every human thought entails implications--ideas that may radiate in many directions and that may originate from many potential sources. Implications of our thinking and behavior exist whether we perceive them or not. *Related Critical Thinking Principle:* It is essential to identify and think through the major implications that follow from, or are connected with, the thinking you are focused on. Follow out the implications of reasoning in many potential directions when dealing with complex issues. Think through the significant consequences likely to follow from your decisions before you make them.

8. All thinking occurs within some point of view, perspective, or frame of reference, situated within a worldview. *Related Critical Thinking Principle:* To reason justifiably through an issue, you must identify significant points of view relevant to the issue and enter them empathically. Enter opposing viewpoints

to be moved by superior reasoning, rather than to defend a position you already hold. Always bank on the best reasoning in a given circumstance, rather than following a given person - including yourself.

9. All thinking has potential intellectual strengths and weaknesses and hence should be routinely and systematically assessed according to objective criteria for thought.

These criteria have been documented and developed throughout human history, and are found in all ordinary, or natural, languages, and hence in all primary dictionaries within natural languages. Intellectuals reasoning at the highest levels within all *bona fide* disciplines and fields of study faithfully attempt to adhere to these criteria. *Related Critical Thinking Principle:* To reason well on a consistent basis, across the domains of your life, you must monitor your thinking to ensure that it adheres to universal intellectual standards. Here are a few essential intellectual standards: clarity, accuracy, precision, relevance, depth, breadth, logic, significance, and fairness.

10. Human thinking is not necessarily fair, since humans, frequently driven by selfish and narrow group-centered goals, are given to ignoring or downplaying the rights and needs of others.

Related Critical Thinking Principle: Fairmindedness requires that people consider all viewpoints with an open mind, without reference to their own feelings or vested interests, or the feelings or vested interests of their friends, community, nation, or species. It implies adherence to intellectual standards, again, without reference to one's own advantage or the advantage of one's group. To reason critically in the fullest sense of the term, you must strive to be fairminded in all domains of your life entailing an ethical dimension.

11. The mind does not naturally distinguish between what it knows and what it does not know and therefore is not intrinsically

predisposed toward intellectual humility.

Rather the natural state of humans at any given moment is to believe themselves to be in possession of the truth, or to think they know more than they know. The human mind is naturally intellectually arrogant, which entails intrinsic self-validation and protection of one's belief systems. People do not tend to intrinsically seek to discover their misunderstandings, distortions, and ignorance. *Related Critical Thinking Principle:* To embody intellectual humility you must actively work against the natural human tendency to be intellectually arrogant; this necessitates regularly distinguishing what you know from what you do not know. To a large degree, you must build your knowledge base through the knowledge of your own ignorance.

12. The mind does not naturally develop intellectual courage—the willingness to examine beliefs one holds dear and which one may have protected for many long years.

Most people are not naturally comfortable standing up for beliefs that, though reasonable, are unpopular. Instead the intrinsic inclination of the human mind is to protect its beliefs and to conform to group standards of acceptability. The mind innately avoids, and even fears, discovering its false beliefs. And people are often, by nature, afraid of ridicule or exclusion from a social group. *Related Critical Thinking Principle:* To embody intellectual courage, you must be willing to challenge a given belief, whether the belief is your own or another's. You must work past your natural egocentric and sociocentric tendencies to determine what makes most sense to believe – without regard to whether you have believed it in the past, how long you may have held the belief, or whether it is popular to hold the belief.

13. The mind does not naturally develop intellectual empathy. Rather it is predisposed toward its opposite—narrowness of vision, or reasoning within its own constricted and

often self-serving viewpoint. Intellectual empathy entails understanding the need to imaginatively put oneself in the place of others to genuinely understand them; it requires practice in thinking within the viewpoints of others, especially those with whom one disagrees. *Related Critical Thinking Principle:* To embody intellectual empathy, you must sympathetically enter into points of view that differ from your own and articulate those views faithfully and insightfully.

14. The mind does not naturally develop intellectual integrity which is manifested in the commitment to hold oneself to the same standards of evidence and proof one expects others to meet--especially one's antagonists. Humans do not naturally embody intellectual integrity. Instead, they tend to hold others to higher standards than the standards they impose on themselves. They often say they believe one thing, while their behavior implies that they in fact believe something else. *Related Critical Thinking Principle:* To exemplify intellectual integrity, consistently and systematically hold yourself to the same standards you expect others to meet. Say what you mean and mean what you say.

15. The mind does not naturally develop intellectual perseverance--the disposition to work one's way through intellectual complexities despite frustrations inherent in a given intellectual task. Intellectual perseverance is not natural to the mind, as it requires the mind to be flexible rather than adhering to old patterns, the latter of which is more comfortable. The mind does not easily and naturally tolerate, much less invite, confusions, difficulties, and frustrations when working through problems and issues. *Related Critical Thinking Principle:* Developing your mind to a high degree requires the cultivation of intellectual perseverance, which inherently entails working through, and even inviting, complexities and frustrations without giving up.

16. The mind does not naturally develop confidence in reason or, in other words, the disposition to recognize that consistently engaging in high-quality reasoning is essential to living a rational life and to creating a more fair and just world.

Confidence in reason is based on the belief that, in the long run, one's own higher interests and those of humankind at large are best served by giving the freest play to reason, by encouraging people to come to their own conclusions, by developing, as far as possible, the rational faculties of everyone in a society. Those who embody confidence in reason are keenly aware of the fact that the mind does not naturally use intellectual standards to determine what to believe and what to reject. They therefore attempt at all times to adhere to intellectual standards in determining what to accept and what to reject in human thought. *Related Critical Thinking Principle:* To develop confidence in reason, you must always seek to discern, and then follow, the best reasoning in a given context and situation. This means, among other things, understanding the irrational propensities of the human mind that stand in the way of your ability to open your mind to reasoning you would rather not have to consider, and actively working to minimize these irrational tendencies. It entails strict adherence to intellectual standards when determining what to believe.

17. The mind does not naturally develop intellectual autonomy or, in other words, the disposition to take responsibility for one's own thinking, beliefs, values, and actions. Intellectual autonomy is acquired as one increasingly takes responsibility for one's own thinking and the quality of one's life. It is the opposite of being dependent on others for the direction and control of one's decisions. Intellectual autonomy is rare in human life. Most people, rather than thinking autonomously, conform to group beliefs and actions. The groups they join and within which

they are born often control their thoughts. *Related Critical Thinking Principle:* To develop intellectual autonomy entails taking full responsibility for your own thinking as well as your own actions. It means having the courage to stand alone in your beliefs, against even large crowds, when your views are those best justified given the evidence.

These seventeen first principles in critical thinking are *some* of the principles central to any substantive conception of critical thinking, or in other words, of critical reasoning. All of them entail interrelationships, and many overlap with one another. Again, all of these particular first principles arise from three conceptual sets in the Paulian approach to critical thinking: *the elements of reasoning, intellectual standards, and intellectual virtues*. Importantly, these principles intimately connect with other best thinking and best theory in the field of critical thinking, originating from the time of Socrates. For an expansion of these principles, see *The Thinker's Guide to Critical Thinking Competency Standards* (Elder & Paul, 2007).

However, if these first principles are not yet intuitive to you, the reader, as first principles in critical thinking, consider this: taking together the elements of reasoning and intellectual standards, as a set of interconnected concepts at the heart of critical thinking, one must assume the theory of both in order to negate either, should one be so inclined. For instance, if one were to argue that “neither the elements of reasoning nor the intellectual standards are central to analyzing and assessing reasoning,” one would, by necessity, be *using* the elements and intellectual standards in the very act of attempting to negate them. This is true because, in making such a statement, one would be saying something one considers to be both *clear* and *accurate*, and one would have some *purpose* in making the statement. By perceiving oneself to be both *clear* and

accurate, one proves the importance of intellectual standards in reasoning. Further, since the speaker will naturally have some purpose in making the statement, the element of purpose is proven as a theoretical construct. And where one element of reasoning can be identified, the other seven are implied.

Further, if we presuppose the importance of the ethical dimension in human life, as well as the intrinsic pathologies of the human mind such as egocentric and sociocentric thinking that work against ethical reasoning, we demonstrate the essential importance of intellectual virtues as guiding theory for first principles in critical thinking, as outlined in numbers 10-17 above. Those who reason at the highest levels of human thought and understanding will embody these and other related intellectual virtues to a significant degree.

Many additional first principles in critical thinking can be identified from the seminal work of Richard Paul, but again, those introduced here are the most intuitive and form a central web of foundational concepts at the heart of a future field of critical thinking studies.

VII. Paul's Additional Seminal Contributions to a Substantive Conception of Critical Thinking

Beyond these first principles, and the fundamental theory that gives rise to them, the depth and breadth of Paul's primary contributions to the field of critical thinking cannot of course be captured in a brief article. However, it is feasible to mention a few of the significant contributions made by Paul that are often either misunderstood, ignored, or given little consideration by those studying critical thinking, either as students or as scholars of critical thinking. These contributions include:

1. Paul's focus on the importance of deeply understanding and emphasizing

the logic of natural languages in a robust conception of critical thinking (Paul, 1985).

2. Paul's insistence that the human mind is best understood fundamentally from a conceptual perspective, rather than a scientific or mathematical point of view.
3. Paul's view that ethics must be distinguished from other modes of thought, such as theology, social conventions, and the law. As he says:

We Must Learn to Distinguish among
Questions of Ethics, Social Conventions,
Religion, and the Law

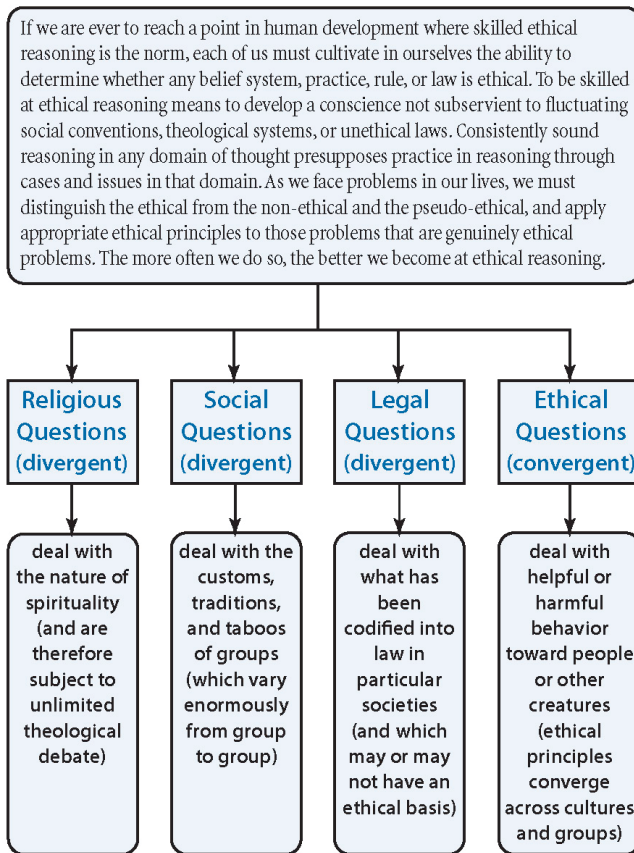


Figure 2 (Paul & Elder, 2003)

4. Paul's emphasis on the logic of questions as central to a developed

approach to critical thinking. See *The Thinker's Guide to Asking Essential Questions* (Elder & Paul, 2009) and *The Thinker's Guide to the Art of Socratic Questioning* (Paul & Elder, 2007).

5. Paul's delineation of three question types: 1) questions entailing one system or procedure for finding the appropriate or correct answer, 2) questions of preference which entail no system for finding the answer except one's subjective taste, 3) questions requiring reasoned judgment for which there is no agreed-upon correct answer but rather better or worse answers. See figure 4.

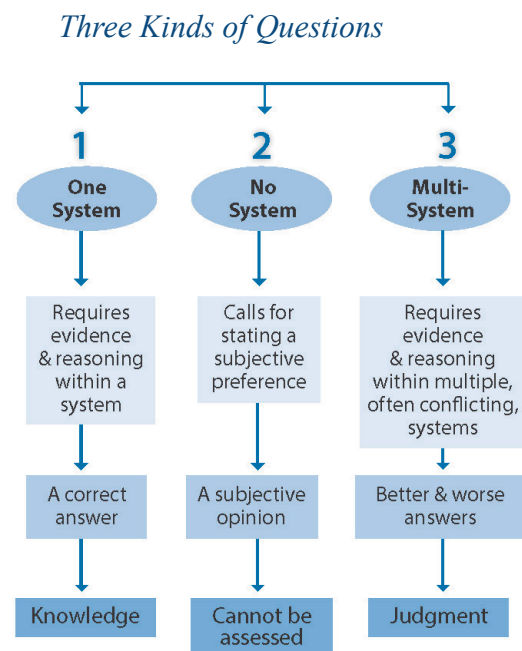


Figure 3 (Paul & Elder, 2014)

Also see *The Thinker's Guide to Asking Essential Questions* (Elder & Paul, 2009).

6. Paul's insistence on the importance of encouraging dialogical and dialectical reasoning in the classroom, and in human societies more generally, in

order to advance critical thinking.. See Paul’s article on this subject entitled “Dialogical and Dialectical Thinking” which appears in an anthology of his work (Paul, 2012a).

7. Paul’s creation and development of a glossary of critical thinking terms and concepts which provides a constellation of concepts central to understanding rich ideas of *critical thinking, the critical person, and fairminded critical societies*. See *A Glossary of Critical Thinking Terms and Concepts* (Elder and Paul, 2013).
8. Paul’s development of *Critical Thinking Polarities*. (See figure 4). For definitions of these polarities, see *A Glossary of Critical Thinking Terms and Concepts* (Elder and Paul, 2013).

Assessing Frameworks for Thinking Using Six Polarities

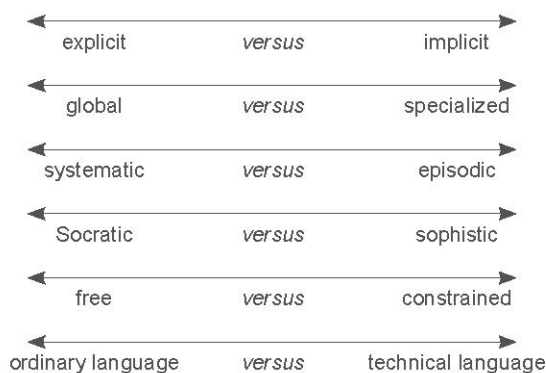


Figure 4 (Paul, 2011)

9. Paul’s application of critical thinking to a substantive theory of education and to the practice of education at all levels. See the many curriculum materials at criticalthinking.org developed by

Richard Paul, Gerald Nosich, and this author.

10. Paul’s inclusion of and emphasis on egocentric and sociocentric thinking as profound barriers to the cultivation and advancement of critical thinking. See *The Thinker’s Guide to the Human Mind* (Elder & Paul, 2015).

VIII. The Importance of Establishing an Independent Field of Critical Thinking Studies and Why the Emergence of Such a Field Has Little Chance in Today’s Political, Social and Academic Climates

It is essential for a *valid* field of critical thinking studies to emerge if we are to properly advance a robust conception of critical thinking that can be actively employed across cultures, persons, subjects, disciplines, and professions. This we can hope for at some point in the distant future, if ever, since far too many substantial and pervasive variables work against it to expect its realization in the present or near future. To put this another way, the development of a field of critical thinking studies and the cultivation of further rich theory of critical thinking are severely hampered by a number of complex variables and influences. To a considerable degree Richard Paul himself dealt with these barriers in his *INQUIRY* article entitled “Reflections on the Nature of Critical Thinking, Its History, Politics, and Barriers, and on Its Status across the College/University Curriculum Part I” (2011). Though there are indeed many important variables obstructing the cultivation of critical thinking as a field of studies, I will focus in this section on four primary barriers:

1. the perspective and worldview through which philosophers tend to view and treat critical thinking as a conceptual construct,
2. the fact that most teachers and faculty

at all levels tend to see themselves as fostering critical thinking in their courses when little evidence supports this notion,

3. the fact that even teachers dedicated to learning a substantial conception of critical thinking tend to have great difficulty internalizing such a conception given its inherent complexities and the fact that they often not taught the requisite intellectual skills for comprehending complexities within a rich theory of mind and of critical reasoning, and
4. the fact that freedom of thought and the cultivation of the liberally educated mind, both of which are intimately connected with a rich conception of critical thinking, tend to be little discussed or valued in human cultures or educational systems today.

To begin, then, one highly significant and perhaps insurmountable barrier to the establishment of a field of critical thinking studies is the way in which philosophers tend to view critical thinking, or in other words, the world view of professional philosophy today. The field of philosophy has failed to recognize critical thinking as a field of studies or even as a theoretical construct worth taking seriously, yet, ironically, departments of philosophy in colleges and universities in the U.S. have not hesitated to teach “critical thinking” for the purpose of increasing student enrollment in their programs. Indeed critical thinking courses are often the bread and butter of philosophy departments thus justifying their existence as a viable academic field in which students should be required to take courses.

Further, philosophers frequently control who teaches critical thinking on their campuses, often requiring critical thinking instructors to hold a philosophy degree.

These “critical thinking” courses tend not to be critical thinking courses at all, but rather courses focused strictly on, or taught in combination with, metaphysics, Kantian philosophy, Aristotelian logic, informal logic, argumentation theory, or some other (not infrequently esoteric) philosophical subject. Where genuine critical thinking concepts and principles *are* included in these courses, they tend to be presented as a smorgasbord--with students expected to pick and choose among the items and plunk them altogether in the sandwich of their minds for a palatable taste. *But what theory are they to choose from this smorgasbord by which they will live their lives?* Is it Kant’s theory of ethics, or the best fallacy theory written by the most well known authors today, or Russell and Whitehead’s early work on formal logic? Or should they go with Hume’s or Locke’s theory of mind? Or should they figure out a way to meld together Aristotelian logic with Plato’s view on metaphysics? Or so on and so forth?

By what standards will students appropriate the most sound and meaningful ideas they are learning in these courses? To what degree and in what ways are students learning to integrate powerful ideas into their thinking and to understand the interrelationships between and among them? What tools of criticality are students in these courses learning which will help them think through the best ideas offered by the best theoreticians of mind throughout history? How do the ideas students are expected to learn help them reason critically through the real problems of their lives? Or are departments of philosophy not responsible for helping students come to understand what it would mean, truly, *to live the examined life?*

As long as critical thinking is equated, at the will of philosophy departments, with other philosophical theoretical constructs, it can never be established in its own right as a field of study, either within philosophy or

another academic division. Further, as long as philosophy instructors are allowed to teach their traditional subjects *as* critical thinking, these instructors will continue to impede the cultivation of critical thinking as a rich, living, essential, and developing set of theoretical understandings.

A second highly significant barrier to the advancement of critical thinking in education and society is the fact that teachers at all levels tend to believe that they themselves are already fostering critical thinking by virtue of the fact that they are teachers. Fifty years ago, the term “critical thinking” was almost never used in academia. Before 1970 the term was rarely discussed or mentioned in educational communities at any level. Today, largely because the use of the term “critical thinking” has become almost commonplace in educational propaganda, research shows that the majority of most teachers and instructors *fundamentally* see themselves as advancing critical thinking in their instruction. More generally, people in human societies increasingly invoke the use of the term “critical thinking” in political and social discussions and in business settings. Still, studies repeatedly illuminate the fact that very few instructors can articulate a rich conception of critical thinking or exemplify how they foster critical thinking in their courses (Arum & Roksa, 2011; Paul et al., 1997).

A third significant barrier to advancing critical thinking across the curriculum is that, on the whole, teachers and instructors studying Richard Paul’s approach tend to have considerable difficulty understanding its depths and fully appreciating the value of his theories. This is largely influenced by the unintellectual nature of educational programs at all levels of learning. For example, many faculty utilize Paul’s *elements of reasoning* while ignoring *intellectual standards* as essential criteria for *assessing reasoning*. So, in other words,

teachers may “pick” the elements of reasoning out of the Richard Paul’s work, thereby perceiving themselves to be advancing critical thinking, when in fact their students are given no explicit criteria or standards for assessing reasoning. Teachers often want to choose from among the rich theory of critical thinking, rather than appreciating critical thinking as a constellation of intellectual constructs that must be taken together for a rich understanding of critical reasoning. This is highly misleading and diverts us from the most direct path to realizing critical societies – which was always the path Paul was seeking.

Indeed, to effectively employ the complex sets of constructs embedded in a rich conception of critical thinking in working through everyday problems requires a level of disciplined reasoning little appreciated or understood in human societies today. As far as history can tell, appreciation for disciplined thought has rarely been realized by any human cultures on a broad scale.

A fourth barrier to advancing Paul’s rich theory of critical thinking in education and in society is that human cultures today tend not to value freedom of thought nor to place importance on cultivating liberality of mind, both of which are central to Paul’s conception. People across the world tend to lack understanding of the implicit and intimate relationships between critical reasoning, freedom of thought, freedom of speech, and the evolution of the human species. Most people seem either largely uninterested in the ideas of freedom of thought and speech in connection with the advancement of the human species, or they live in countries where they are at risk when openly discussing many issues that would significantly advance their own criticality and deepen their insights into the human mind. But any robust critical thinking will necessarily emphasize the power of opening the mind to every possible idea in order to examine it for reasonability and

usefulness in living everyday. Many teachers fear ideas; they fear opening their minds to new ways of perceiving reality. They fear letting go of ideas they have long held. Such teachers are unfit for the classroom, for they lack the fundamentals for fostering disciplined freedom of thought and helping students reach their potential as emancipated, intellectually free persons.

Still, there is growing recognition globally that critical thinking is largely missing in schools, colleges, universities, and in the professional world. This has led to the pursuit of “critical thinking” or “thinking skills,” at least to some degree, among consultants and presenters.. However, since we currently lack a *legitimate* field of critical thinking studies, charlatans of every stripe, variation, and variety have effortlessly entered the critical thinking arena with their platitudes and naive “solutions” replete with “easy steps” and “best tips” for bringing critical thinking “tools” into the workplace and into daily life. This problem is likely only to worsen as the term “critical thinking” gains even more prominence in the future, but when there is no legitimate academic home to support genuine approaches to critical thinking. Until such a time when there is a legitimate academic home, quick-fix approaches that can never work to bring about long term change in human thought will be advanced *as* critical thinking, and misguided and/or sophistic thinkers looking to advance their own personal interests will continue to employ any number of psychological means to capture the attention of naïve persons and make money on the gullible.

A field of critical thinking studies, a field guided by first principles in critical thinking, could begin to address these problems. Such a field would entail a core constellation of critical thinking terms and concepts which were already well established and which could be further studied and explored by serious scholars of critical

thinking. The work of Richard Paul stands squarely at the center of these principles, and hence at the center of any genuine field of critical thinking studies--should it ever be realized.

IX. Where Richard Paul May Have Been Wrong

It is a popular practice when offering a critique of a theoretician’s work to seek problems in her or his theoretical approach or the ways in which the approach has been applied within a given context by that theoretician. Given the richness of Richard Paul’s conception of critical thinking, along with its soundness and internal integrity, it is very difficult to find problems in Paul’s conceptual approach to critical thinking.

However, we may fault Paul in one major area: his confidence in the notion that people are, on the whole, fundamentally capable of transforming themselves into critical thinkers, even if to a limited degree, no matter where they begin as reasoners. In other words, Paul *placed considerable confidence in the power of learning in human thought*. He greatly advocated the importance of creating the best learning situations for students to thrive in, if they were to be given the chance to cultivate their minds. In the theoretical battle between nature and nurture, Paul squarely placed himself in the nurture camp, giving little consideration to individual streaks of nature that may be so potent as to prevent nurture from effectively transforming the individual.

It is plausible that Paul may have been caught in a paradox. On the one hand, after decades of teaching and designing workshops in critical thinking, Paul could clearly see the intrinsic difficulties in teaching students, teachers, administrators, business persons, indeed anyone, the important complexities in a rich conception of critical thinking. On the

other hand, again, he believed that potentially everyone could learn critical thinking to a significant degree if only they had the *will* to do so. And he thought it was fairly easy to muster up the will to do so, I believe largely because he himself possessed such a high degree of intellectual willpower. He was ever reaching for higher and higher levels of thinking and living throughout his lifetime. He experienced deep satisfaction in his own life from persistently applying critical thinking concepts and principles--as he worked through daily issues and problems. Few people seem oriented to critical thinking in this deep way, even those who study critical thinking for many years. But Paul lived his life in such a way as to increasingly embody the intellectual virtues he thought essential to the genuinely critical person. And he could see no good reason why the majority of people couldn't do the same. Paul did not see himself as exceptional in this regard although he may have indeed been a rare exception.

In any case, though I believe learning to be essential to developing intellectual virtues and becoming a fairminded critical thinker, I am not sure most people are capable of changing at the level and to the degree that Paul envisioned. Like Richard Paul, I take a fundamentally conceptual orientation to the mind (as against a scientific orientation); however, I believe that Richard Paul may have been wrong in his view that people, on the whole, can fundamentally change through critical thinking. We know that some people seem to possess intrinsic egocentric and/or sociocentric drives and orientations so powerful that, although these people may be theoretically capable of changing, it may be, practically speaking, something like impossible for them to change in certain fundamental ways. This may explain why, for instance, *weak sense critical thinkers* who are powerful and privileged, though highly intelligent according to psychological standards and traditional IQ measures, are unable to properly

analyze, assess, and, in essence, take command of their own unethical, selfish nature. And it explains, to some degree, why they are often simply unwilling to consider fundamental change in their worldview. Practically speaking, they cannot learn to change because they lack the commitment needed to transform how they think and how they live; in essence they do not value self-development or self-fulfillment.

My experience has shown me that learning can be effective only to the degree that the learner is committed to the process of learning. This commitment may simply be too difficult for many people to maintain, or even to understand, so narrow-minded and self-centered is their thinking. And if I am correct, then it may be far more difficult than Richard Paul may have imagined for humans to ever realize fairminded critical societies.

Further, Paul believed it possible to transform human societies fundamentally through educational systems. But the work of critics such as Ivan Illich, reminds us of the "hidden curriculum in schooling, with its emphasis on sculpting the student mind to fit into a highly pathological, consumer engrossed, world society" Illich (1978). In his book entitled *Toward a History of Needs*, Illich says:

the hidden curriculum is always the same regardless of school or place. It requires all children of a certain age to assemble in groups of about 30, under the authority of a certified teacher, for some 500 or 1000 or more hours per year. It does not matter whether the curriculum is designed to teach the principles of fascism, liberalism, Catholicism, socialism, or liberation, so long as the institution claims the authority to define which activities are legitimate "education." ... What is important in the hidden curriculum

is that students learn that education is valuable when it is required in the school through a graded process of consumption; that the degree of success the individual will enjoy in society depends on the amount of learning he consumes; and that learning about the world is more valuable than learning from the world. ... hidden curriculum translates learning from an activity into a commodity for which the school monopolizes the market. ... The more education an individual consumes, the more "knowledge stock" he acquires and the higher he rises in the hierarchy of knowledge capitalist. Education thus defines a new class structure within which the larger consumers of knowledge – those who have acquired greater quantities of knowledge stock – can claim to be of superior value to society (pp. 70-71).

Richard Paul believed that deep change would most likely occur in human societies through reforming educational systems, for it is education that is tasked with cultivating the minds of the people living within a society. But if Ivan Illich and others are correct, it may be, practically speaking, virtually impossible to rid our classrooms of the poisons seeping into them from the consumerism and provincial ways of thinking that now seek to overwhelm the intellects of our teachers, administrators, and students. It was not as if Richard Paul could not see these poisons, but rather he believed that, despite these pernicious realities in our schools, the best path to cultivating critical societies must lie firmly within educational systems, for it is these systems that purport to educate and free the mind.

X. Conclusion: Paul as a Revolutionary

Richard Paul was both an original philosophical thinker and a staunch advocate for the evolution of the human species toward

homo sapiens criticus. He often quoted William Graham Sumner's (1906) conception of critical thinking:

The critical habit of thought, if usual in society, will pervade all its mores, because it is a way of taking up the problems of life. Men educated in it cannot be stampeded by stump orators ... They are slow to believe. They can hold things as possible or probable in all degrees, without certainty and without pain. They can wait for evidence and weigh evidence, uninfluenced by the emphasis or confidence with which assertions are made on one side or the other. They can resist appeals to their dearest prejudices and all kinds of cajolery. Education in the critical faculty is the only education of which it can be truly said that it makes good citizens. (p. 633)

Paul had an insatiable curiosity for understanding the human mind--for understanding how it works through issues and problems using reasoning and how to improve human thought once problems are revealed within it. His emphasis on understanding reasoning and its many conundrums and complexities never waned throughout his life. As briefly detailed in this article, early in his academic career, Paul closely examined and critiqued existing theory of logic and reasoning--in the process significantly reconstructing and enriching the theory of both--by asking basic questions and following out foundational implications. He took a very narrow conception of reasoning (still used widely among philosophers today) and broadened it to more accurately represent what in fact happens in human thinking when people reason. He captured the idea of *universal intellectual standards* by exploring standards typically used by skilled reasoners and then assembling these standards or criteria into a

constellation of ideas easily understandable by everyday persons. Recognizing the importance of placing ethics at the heart of a substantive conception of critical thinking, he cultivated what little theory then existed on intellectual traits, dispositions, or virtues. Paul also realized that, without intervention in egocentric and sociocentric tendencies, the mind was likely to miss mistakes and pathologies in thinking; hence as early as the 1980s Paul stressed the importance of teaching critical thinking in the strong (ethical) sense, rather than in the weak (selfish) sense.

Though Paul was, in the main, a theoretician who found deep satisfaction in the exploration of ideas for their own sake, he was fundamentally a *practical theoretician*. He believed in bringing theory down to the level of mundane reality (“to the level of nits and fleas,” he once said); he himself routinely, and on a daily basis, tested theory in working through real life problems. He systematically moved back and forth between the development of theory and assessing its actual use in working through problems in his own life—both personal and professional. He was largely uninterested in traditional philosophical arguments, discussion, and theory because he perceived them as a virtual waste of time, when the reality of suffering by humans and other sentient creatures is palpably before us.

It is my judgment that no thinker in human history has contributed more to the fundamental theory of critical thinking than Richard Paul. Not only did Paul revolutionize our conceptions of *reasoning*, of *critical reasoning*, and of *logic*, he also called into question both historical and contemporary conceptions of philosophy itself. He linked the cultivation of the mind to the philosophical tradition, not of Plato after Plato turned to metaphysics and science, but of Plato as defined through his earlier Socratic dialogues. Paul continually emphasized the importance of developing deep conceptual understandings,

based in foundational ideas and principles of analysis and critique. Like Socrates, Paul continually sought the most basic and explicit ideas for entering, understanding, deconstructing and correcting thought.

To bring a rich yet highly accessible conception of critical thinking to everyday teachers and everyday persons, Paul established first the Center for Critical Thinking and Moral Critique in 1980 and then the Foundation for Critical Thinking in 1991. Working over 35 years with colleagues, scholars, and staff through these organizations, Paul did more to spread understanding of the idea and importance of fairminded critical thinking than any other person or institution in the world. Through his guidance, the Foundation for Critical Thinking has developed outreach efforts that span the globe, and it now stands as one of the oldest autonomous intellectual think tanks in the world. Richard Paul worked indefatigably and with steady determination throughout his life to bring basic principles of critical thinking to his students and to educators and educational leaders at all levels and within all academic subjects.

Again, Paul believed in the power of the human will to embrace critical thinking principles, and he consistently reminded us that, if critical thinking ever is to prevail, it will prevail only in the long run. When we look at the world as it is today with its many weighty, complex, difficult, and pressing problems, it is clear that Paul’s insistence in the 1980s on the importance of critical thinking for a rapidly changing world, a world replete with accelerating change, intensifying complexity and increasing interdependence, should have been heeded.

But Paul’s voice, along with others advancing the pressing need for critical thinking, has been largely ignored in educational communities, in the field of

philosophy, in the world of business, and in the world more generally, whatever the propaganda may otherwise imply.

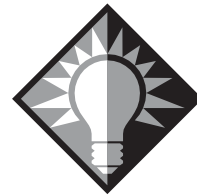
As the world becomes frighteningly more complex, reasonable persons can see the importance of finding a higher, more enlightened path. That path, as Richard Paul well understood, can only be found through changing *the ways in which people fundamentally reason through the problems of their lives*. We need students learning the best theory of mind, gleaned from the best ideas throughout history, applied at the highest levels possible. For this we need teachers with the ability to reason through ideas at a high-level of skill and understanding as well as the ability to foster these understandings by their teaching. For this we need academic programs that foster these skills and understandings, so that teachers themselves can learn these skills. For this we need an academic field of study that cultivates our understanding of critical thinking as its primary purpose, rather than academic fields that inadvertently thwart its development.

We need, in short, to establish critical thinking as a field of studies in its own right - a field that will properly illuminate, develop, and advance first principles in critical thinking. A sober and intense study of Richard Paul's writings on critical thinking offers a tangible, reliable, and distinguished beginning place. Let us hope, with the threat of nuclear destruction omnipresent and with the already devastating realities of climate change before us, that we learn to embrace the ideas Richard Paul offered to us and for which he dedicated his life, before it is too late for us to turn back from the deep problems we have created, as *homo sapiens*, on the planet.

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

by Gerald Nosich

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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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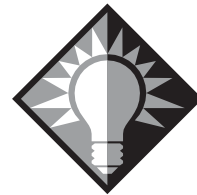
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Truth-seeking Versus Confirmation Bias: How Richard Paul's Conception of Critical Thinking Cultivates Authentic Research and Fairminded Thinking

by Amanda Hiner
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Abstract

This article, written in response to a kind invitation by Linda Elder, Gerald Nosich, and Frank Fair to contribute a reflective piece honoring the life, work, and intellectual contributions of Dr. Richard Paul, focuses on the ways in which his conception of critical thinking fosters fairminded, authentic, ethical reasoning and research. Richard Paul's framework for critical thinking emphasizes and cultivates Socratic, "strong-sense," fairminded thinking and intellectual humility, enabling students to understand the implications of fairminded research and providing them with valuable strategies to combat egocentrism and confirmation bias. This article explains not only why the Paul/Elder conception of critical thinking fosters fairmindedness and ethical reasoning in both students and teachers, but it outlines how the application of this framework for critical thinking can transform classroom teaching and research paper assignments in order to encourage and cultivate metacognitive analysis and authentic research in student writers.

Key words: Critical thinking, fairmindedness, research writing, strong-sense critical thinking, confirmation bias

I. Introduction

"Strong-sense critical thinkers are not easily tricked by slick argumentation, by sophistry and intellectual trickery. The striking characteristic of strong-sense critical thinkers is their consistent pursuit of the fair and just. These thinkers strive always to be ethical – to behave in ways that do not exploit or otherwise harm others. They work to empathize with the viewpoints of others. They are willing to listen to arguments they do not necessarily hold. They change their views when faced with better reasoning."

Richard Paul and Linda Elder,
*Critical Thinking: Tools for
Taking Charge of your Learning
and Your Life*, p. 3

In *The Improvement of the Mind*, Isaac Watts (1741/1821) delineated necessary character traits, dispositions, and habits associated with substantive learning and intellectual discovery. Watts, an eighteenth-

century Nonconformist theologian and logician, cautioned students to guard against intellectual arrogance, stating, "Remember this, that if upon some few superficial acquirements you value, exalt, and swell yourself . . . you are thereby building a most unpassable barrier against all improvement" (p. 6). He further encouraged students to approach subjects in a deep and substantive manner and to seek to unearth new truths and new discoveries:

Do not hover always on the surface of things, nor take up suddenly with mere appearances; but penetrate into the depth of matters . . . do not indulge yourselves to judge things by the first glimpse, or a short and superficial view of them; for this will fill the mind with a errors and prejudices, and give it a wrong turn and ill habit of thinking . . . [Instead] call yourselves to an account what new ideas, what new proposition or truth you have gained. (pp. 10–11)

Above all, Watts cautioned, “Maintain a constant watch at all times against a dogmatical spirit” (p. 12); refuse to adhere to any belief “till you have some firm and unalterable ground for it, and till you have arrived at some clear and sure evidence; till you have turned the position on all sides and searched the matter through and through, so that you cannot be mistaken” (p. 12). According to Watts, who had seen his own father imprisoned for holding unpopular and dissenting beliefs, authentic intellectual inquiry begins and ends with a commitment to seek truth at all costs and to persevere in learning even when it is difficult and costly.

In the opening chapters of his popular educational treatise, Watts anticipated several key claims and assumptions reflected in the framework of critical thinking developed and promoted by the late Dr. Richard Paul and his colleague Dr. Linda Elder of the Foundation for Critical Thinking. Paul’s framework of critical thinking provides instruction not simply on how to reason through complex information and to apply rigorous intellectual standards to assess that reasoning (Paul & Elder, 2006, pp. xvii–xxix); fundamentally, it emphasizes cultivating an acute understanding of our innate egocentrism, our tendency toward intellectual laziness, and our unwillingness to accept facts that challenge preconceived notions of what we believe must or should be true. Substantive, authentic intellectual growth involves much more than simply learning techniques for analyzing, synthesizing, and assessing information and claims. It involves a capacity and willingness to see below and beyond our own process of thinking and to apply rigorous ethical standards to that process, as well as to engage in an almost ruthless critical assessment of the logic and reasonableness of our own deeply held assumptions, preconceptions, and beliefs.

For over twenty years, I have taught composition, research writing, literature, and critical thinking at the college level, instructing

students in how to conduct academic research, write analytical papers, and organize arguments. In both introductory and graduate-level courses, I require the application of micro-skills such as gathering and assessing sources, taking notes, organizing ideas and claims, constructing thesis statements, and integrating borrowed material into arguments. However, one aspect of the research-writing process has remained consistently challenging for me. While my students can often demonstrate a measure of improvement in research and writing skills over the course of a semester or even an assignment, they sometimes employ these skills to construct arguments that seem sophisticated, disingenuous, or inherently misleading. Whether they engage in occasional “cut and paste,” mosaic Internet plagiarism, or, more frequently, simply choose a preliminary argument and selectively choose sources that support that argument, students often miss the most important point of intellectual inquiry and research: allowing one’s own conclusions to develop authentically from a broad and deep investigation of evidence with an awareness of one’s own biases and intellectual limitations. Like most educators, I find that challenging and changing my students’ assumptions about what it means to research, reason, and think in an authentic and fairminded way is one of the most important goals I have as a teacher; yet it is also one of the most difficult tasks I encounter in the classroom. In this paper, I address the ways in which the adoption and incorporation of Richard Paul’s concepts of the intellectual character traits; of first-order, *strong-sense* critical thinking; and of authentic, substantive learning have transformed the way I teach student research and writing.

II. Integrating the Paul/Elder Conception of Critical Thinking

With the 2003 integration of Paul’s conception of critical thinking into the required, General Education advanced research and critical-thinking course at my institution,

Winthrop University, I was introduced to a practical and highly transferable method to teach my students how to analyze, synthesize, and assess data and claims. More importantly, and wholly unexpectedly, I also encountered in the Paulian model a powerful conceptual framework to clarify and modify my students' understanding of cognitive dissonance, authentic research, and fairminded thinking, thus furthering their intellectual transition from weak-sense to strong-sense critical thinkers. This *affective* component of Paul's model of critical thinking – its rich, highly developed concept of intellectual fairness, empathy, and rigor – has proven to be remarkably valuable to me as a teacher, for it has enabled me to address and teach in an explicit, deliberate way what it means to be a fairminded thinker and why it is so important for both teachers and students to cultivate this disposition.

In their seminal work *Critical Thinking: Tools for Taking Charge of Your Learning and Your Life*, Richard Paul and Linda Elder (2006) classify all thinking as either *first-order* (spontaneous, non-reflective, and often ineffective) or *second-order* (critical, conscious, metacognitive, and deliberate) (p. xxv). As teachers, we strive to teach our students how to reason through complex information and persuasive claims in a deliberate, self-aware, and critical way, but often lack a systematic method to teach these concepts. Though traditional pedagogical methods, including even Watts' *Improvement of the Mind*, focus on cultivating intellectual skills such as reading, taking notes, "fixing the attention of the mind," and "inquiring into causes and effects" (1741/1821, pp. 155, 223), many of these methods lack a comprehensive explanation of what the mind must *do* in order to read or analyze *well* (identify an important purpose; articulate key questions at issue; assess the accuracy, breadth, and depth of information; draw logical and relevant conclusions; understand and articulate assumptions; consider the implications of

ideas and claims; define key concepts; and consider multiple points of view and contexts). By applying Paul's elements of reasoning and the intellectual standards to information, arguments, and claims, students quickly move from mere recall of facts to deeper understanding. Once students can clearly articulate an argument's purpose, questions at issue, assumptions, and implications, they can often demonstrate substantive understanding and mastery of a subject or topic. In addition, once they can assess the accuracy and relevance of information, the clarity and precision of claims, the logic of arguments, and the depth and breadth of analysis – intellectual skills taught in the Paul/Elder articulation of critical thinking – they are equipped to draw meaningful and well-supported conclusions about their research.

But even these important analytical and evaluative skills rely for their effectiveness and legitimacy on a deeper, ethical component. Student researchers must be willing to use and interpret data in ways that reflect the reality or truth about a situation rather than the desired outcomes of the researchers. In *Critical Thinking: Tools for Taking Charge of Your Learning and Your Life*, before presenting even an initial description of their comprehensive method of critical analysis and assessment, Paul and Elder (2006) emphasize to the reader that, in order to become a critical thinker:

You will have to catch yourself in acts of selfishness and begin to correct your behavior. You will have to become committed to living a rational, compassionate, contributory life, to look outside yourself and see how your behavior affects other people. You will have to decide, again and again, that being fair-minded is crucial to your identity as a person. (p. 1)

This commitment to cultivating a fairminded approach to data and claims and to responding to others with empathy and compassion must

reside at the center of everything we do in our classrooms as teachers. Prior to integrating the Paul/Elder conception of critical thinking into my research writing courses, I sometimes felt a nagging fear that I might teach students methods of argument, analysis, and data collection only to see those skills used in sophistic, unethical ways. What if my students simply become skilled at presenting biased arguments or hiding disconfirming evidence? How can I get them to understand that there is a larger ethical context to the choices we make as researchers and scholars, and that this ethical component of scholarship is foundational to the larger goals of higher education, expressed in the American Association of Colleges and Universities' "The Principles of Excellence" (2007) as the deliberate cultivation of "civic, intercultural, and ethical learning" and the development of "personal and social responsibility" (p. 1)? The Paul/Elder conception of critical thinking places fairmindedness and exemplary intellectual character traits at the heart of critical thinking, providing teachers and students with not only the *intellectual strategies* but also the *ethical context* for what we do as researchers and scholars.

Paul and Elder (2006) explain that "critical thinking can be used to serve two incompatible ends: self-centeredness or fairmindedness" (p. 2). Our students can use the intellectual skills and strategies we teach them to manipulate data and facts in order to "win" arguments, engage in sophistry, or construct eloquent but fundamentally dishonest rhetorical appeals. Conversely, they can use these same skills to assess their own reasoning, hold themselves to the same high standards they apply to their intellectual and political opponents, and pursue truth even if it is costly or unpopular. Paul and Elder (2006) call the first type of critical thinkers, those we might call sophists, *weak-sense critical thinkers*; they designate the second type of critical thinkers, those who "consistent[ly] pursu[e]

the fair and just" and "strive always to be ethical," as *strong-sense critical thinkers* (p. 3). One of the most difficult and persistent problems teachers face is finding ways to address students' pervasive misunderstanding about the nature of authentic research and intellectual inquiry. Having taught both traditional, advanced composition courses focused on research writing (WRIT 102: Argumentative Writing) and a modified version of that course integrating Paulian critical thinking in a substantive way (CRTW 201: Critical Reading, Thinking, and Writing), I have found that the Paul/Elder framework of critical thinking provides an invaluable method for instructing students in how to function as ethical, fairminded thinkers and authentic researchers through its explicit emphasis on metacognitive self-analysis and its instruction in the impediments to critical thinking and the intellectual character traits.

III. The Pervasiveness of Confirmation Bias in Research

Writing teachers are trained to offer students techniques in paper organization, library research, and note-taking, but a deeper and more troubling problem persists: students' concept of research consists of searching for data that support their preconceived notions about what must or should be true or what is commonly believed about a topic. Their research methods often conform to the following pattern: students select a research topic, identify a question at issue, answer that question by writing a tentative thesis or hypothesis, and then search the Internet or library databases for supporting evidence. Information in articles or books that challenges or disconfirms the proposed argument is usually ignored, and, if necessary, quotations and statements may be stretched out of context in the most uncomfortable ways to "fit" or support the original thesis. This pattern of selecting and emphasizing data that fit a preconceived conclusion is called confirmation bias, defined more precisely by Tufts

University Research Professor of Psychology Raymond Nickerson (1998) as “the seeking or interpreting of evidence in ways that are partial to existing beliefs, expectations, or a hypothesis in hand” (p. 175). No matter how articulate, eloquent, or persuasive the final product may be, a student’s research paper is only legitimate if its conclusions reflect the way things really are, based on what experts know to be true about a topic, and if its findings are uncompromised by confirmation bias.

Those who teach writing or research in secondary or higher education probably easily recognize this familiar pattern of weak-sense critical thinking and confirmation bias; we may even reassure ourselves that we would never fall prey to its temptations. But researchers at the highest academic levels are not immune to confirmation bias; in fact, they display it, in varied forms, in their own research at alarmingly high rates. In a meticulously researched and comprehensive article titled “Confirmation Bias: A Ubiquitous Phenomenon in Many Guises,” Nickerson (1998) analyzed the presence and extent of confirmation bias in academic research across multiple disciplines and concluded, “a great deal of evidence supports the idea that . . . confirmation bias is extensive and strong and that it appears in many guises” (p. 3). Nickerson’s exhaustive research into the presence of confirmation bias in academic research revealed that highly trained and specialized researchers in diverse fields such as psychology, geology, physics, medicine, and education participate in both “deliberate selectivity in the use of evidence” and “unwitting selectivity in the acquisition and use of evidence” (p. 175). (In a personal communication, Gerald Nosich has helpfully suggested that we align the term confirmation bias with Nickerson’s second category here, “unwitting selectivity in the acquisition and use of evidence,” which connotes an unconscious bias in favor of confirming evidence.)

According to Nickerson, confirmation bias is evinced in a wide range of guises, such as “hypothesis-determined information seeking and interpreting” (p. 177); “belief persistence” in the face of contradictory evidence (p. 187); and “own-judgment evaluation,” in which researchers display over-confidence in the accuracy of their own judgments in the face of contradictory evidence (p. 188). Nickerson’s evidence led him to conclude not only that confirmation bias is prevalent even in published, peer-reviewed academic research, but that the very purpose of academic research is profoundly impacted by the persistence of confirmation bias among researchers. “The evidence . . . supports the view,” Nickerson concluded, “that once one has taken a position on an issue, one’s primary purpose becomes that of defending or justifying that position” (p. 211).

This practice of searching for evidence in order to justify one’s own position or a discipline’s status quo stands in stark contrast to Richard Paul’s (2012c) concepts of “autonomous thinking,” a process of intellectual inquiry in which researchers “use critical skills and insights to reveal and eradicate beliefs to which they cannot rationally assent” (p. 400), and “fair-mindedness,” an intellectual trait focused on overcoming “our egocentric tendency to identify truth with our immediate perceptions of longstanding thought or belief” (p. 404). Confirmation bias persists in both our students’ papers and our own research and poses significant impediments to our efforts to engage in authentic research and fairminded thinking. But what accounts for its pervasiveness and its subtle, yet powerful, appeal, even in the face of continual and institutionalized academic instruction on the correct use of borrowed information and analytical interpretation of research data?

IV. “Believing is Seeing”: Confirmation Bias and Blind Spots

Our tendency to only see, validate, and accept claims, facts, and evidence that conform to our ingrained beliefs and assumptions has been well-documented by scholars. Francis Bacon, for example, explained that “the human understanding when it has once adopted an opinion (either as being the received opinion or as being agreeable to itself) draws all things else to support and agree with it” (*Novum Organum*, 1620/2000, p. 43). Similarly, Thomas Kuhn, in his seminal text *The Structure of Scientific Revolutions*, revealed the ways in which “shared paradigms” within a scientific community effectively blind researchers to non-conforming evidence: “no part of the aim of normal science is to call forth new sorts of phenomena; indeed, those that will not fit the box are often not seen at all” (1962/1970, p. 24). According to the social psychologists Carol Tavris and Elliot Aronson (2007), all of us confront daily what Watts calls “most unpassable barriers” constructed from our own egocentrism and cognitive blind spots: “the brain is designed with blind spots, optical and psychological,” Tavris and Aronson explain, “and one of its cleverest tricks is to confer on us the comforting delusion that we, personally, do not have any” (p. 42). Impassable barriers, blind spots, boxes, walls, labyrinths – Watts, Kuhn, Tavris, and Aronson offer a number of metaphors to describe the cognitive conditions that create or support what Paul (2012) terms “*weak-sense* critical thinking” – the type of thinking that “fails to consider, in good faith, viewpoints that contradict its own . . . [and] lacks fair-mindedness” (p. 2).

In *Mistakes Were Made (but not by me): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts*, Tavris and Aronson (2007) catalog and analyze instances of confirmation bias, cognitive dissonance, and blind spots across multiple disciplines, including law, politics, pharmacology, and psychology. Perhaps one of the most important conclusions offered by their revealing analysis involves

the deeply embedded and complex nature of the relationship between confirmation bias, cognitive dissonance, and blind spots. Because of our tenacious and psychologically ingrained need to feel justified in our behavior and beliefs, we resist evidence and arguments that challenge our preconceived notions of what is true or possible. The uncomfortable cognitive dissonance we feel when confronted with disconfirming information leads us to engage in irrational and self-deluding behaviors such as denial and confirmation bias. A mental technique as powerful as cognitive dissonance can cause us to believe that “no evidence – the *absence* of evidence – is evidence for what we believe” (p. 20). Cognitive blind spots operate as mechanisms that enable our confirmation bias and belief perseverance to hum along unhindered. We cease to be able to see where we are wrong, mistaken, and biased, and our research is propelled not by the dictum “seeing is believing” but by the motto “believing is seeing” – the very phenomenon analyzed by Kuhn (1962/1970) in his discussion of a “switch in visual gestalt” when researchers switch belief paradigms (p. 111).

V. Developing Strong-Sense Critical Thinking in Student Researchers

If Tavris, Aronson, and Kuhn are right, then, we appear to be locked in a hopeless situation: our own compulsion to feel justified and right in our conclusions will lead us to engage in confirmation bias while also being sheltered from the knowledge of our inherent bias by our own cognitive blind spots. And this situation might be hopeless, except for one important – and accessible – remedy: self-awareness. Tavris and Aronson (2007) note, “We cannot avoid our psychological blind spots, but if we are unaware of them we may become unwittingly reckless, crossing ethical lines and making foolish decisions” (p. 44). Cultivating self-awareness involves both deliberate introspection and the act of surrounding oneself with “a few trusted naysayers” (Tavris & Aronson, 2007, p. 66),

people who are willing to contradict and challenge our claims and beliefs and to protect us from what Kuhn (1962/1970) called a sort of intellectual “insulation” that can happen in academic communities knit together by shared assumptions (p. 164). One of the best ways to cultivate this type of critical self-awareness is to offer explicit instruction in authentic intellectual inquiry and fairminded thinking. Paul’s framework of critical thinking provides instructors and students with a comprehensive intellectual system that accounts for and emphasizes both *cognitive strategies* (including macro-abilities such as comparing or classifying concepts or beliefs and micro-skills such as using critical vocabulary or evaluating facts) and *affective strategies* (such as exercising fairmindedness, developing intellectual humility, suspending judgment, and developing insight into egocentricity) (Paul, 2012c, p. 394). Embedded within the concept of intellectual humility is the idea of being teachable, of reaching out to others for feedback and of welcoming constructive criticism of one’s own ideas. As students integrate the concept of intellectual humility into their understanding of what it means to be a researcher, they must see themselves as one part of a larger community of thinkers and scholars who will sometimes sharpen or correct their assumptions and conclusions.

Apart from a commitment to be fairminded, display intellectual humility, and to seek truth above all, one’s reasoning and research methods remain ethically indeterminate and possibly unfettered from logic or truth. Moreover, given the tendency for educators either to evade ethical considerations entirely or to approach ethical considerations “as a collection of learnings . . . separate from other learnings” and “independent of cognitive development” (Paul, 2012b, p. 255), they miss a valuable opportunity to clarify *why* it is important that students and teachers alike handle data and claims with integrity and hold their thinking

to rigorous intellectual standards. Paul’s model of critical thinking, with its focus on the affective dimensions of thinking such as the intellectual character traits and the awareness of and sensitivity to egocentrism, enables educators to both integrate ethical components into classroom discussions of research methods and to create an academic environment in which strong-sense critical thinking is valued, modeled, taught, and practiced.

Redesigning Instruction to Encourage Authentic Research

Richard Paul (2012a) stresses the necessity of consciously and deliberately redesigning instruction in order to achieve a desired outcome: self-reflective, self-aware students who have mastered and who can apply the intellectual skills, moves, and strategies of the accomplished critical thinker. As Paul (2012a) explains, classroom instruction must include “time to practice [critical-thinking] moves, to talk about the principles that underlie them, [and] to critique and assess one’s own, and others’, use of them” (p. 325). But, just as importantly, students must be encouraged to “strive continually for excellence in practice . . . [and to] be willing to learn from [their] mistakes” (Paul, 2012a, p. 325). Paul advocates designing instructional methods that reflect his deep conviction that “the depth with which [students] understand anything is in direct proportion to the degree to which they have engaged in intellectual labor to figure it out for themselves (2012a, p. 325). “Whatever is to have meaning *to them* must be given meaning *by them*” he emphasizes, and thus students “must actively and intellectually participate in the ‘figuring out’ process” (2012a, p. 322). *Practically, this approach involves allowing more time for students to talk and write; to pose and modify questions; to revise, assess, and critique conclusions; and to analyze and assess information and their own reasoning both in class and out of class.*

More importantly, in addition to

requiring students to engage in active, substantive learning, educators must insist that students cultivate and practice excellence, or fitness, in thinking:

A fit mind can successfully engage in the designing, fashioning, formulating, origination, or producing of intellectual products worthy of its challenging ends. To achieve this fitness the mind must learn to take charge of itself, to energize itself, press forward when difficulties emerge, proceed slowly and methodically when meticulousness is necessary, immerse itself in a task, become attentive, reflective, and engrossed, circle back on a train of thought, re-check to ensure that it has been thorough, accurate, exact, and deep enough. (Paul, 2012a, p. 331)

Paul's description here reflects what instructors desire and demand of students engaged in academic research and higher-order thinking: autonomous, creative, substantive thought subjected to rigorous intellectual standards and motivated by intellectual traits such as perseverance, curiosity, and methodical exactitude. The Paul/Elder method of critical thinking, when substantively integrated into a research-writing class, enables instructors to place instruction in macro-skills and micro-abilities within a context of deeper, more foundational affective traits that bring a necessary ethical dimension and motivation to student research.

Modifying My Classroom Instructions and Assignments: The Impact on My Teaching

In order to demonstrate more precisely how my own instruction has changed in response to the integration of the Paul/Elder method of critical thinking, I am going to focus on how I have modified classroom instruction and assignments, specifically my research-paper assignment, in our required CRTW class, a course designed to provide

sustained, focused instruction in critical thinking as well as instruction in research methods, the construction of arguments, and rhetorical analysis. Having taught advanced research-writing courses for many years at several institutions, I initially thought that teaching this revised course would simply involve "adding on" some critical-thinking techniques and strategies to my traditional way of teaching research and writing. I was completely unprepared for how profoundly my own assumptions about what it means to research, reason, and draw logical conclusions would be challenged as a result of learning and practicing Paulian critical thinking. I also did not anticipate how much my teaching, including my most basic assumptions about what it means to teach and learn, would change. As I taught students the elements of reasoning, the intellectual standards, the impediments to critical thinking, the universal critical thinking character traits, and the SEE-I strategy (see appendices), it soon became clear that I was not simply providing students with strategies and techniques for analysis and assessment. I was really asking them to become *different kinds of thinkers* – thinkers who are fair and just, who seek the truth at all costs, who genuinely want to understand the perspectives of those with whom they disagree, who are quick to listen and slow to pass judgment, and who persevere through difficult intellectual tasks.

In addition, I became much more intentionally purpose-focused and ethically-minded in my teaching. For every assignment, I began to clarify explicitly both to myself and to my students what I hoped to achieve, what I wanted them to learn, and what I desired as outcomes. My teaching took on a heightened joy and intensity when I felt free to address the "whys" behind what we do as students, teachers, and thinkers. *Why* is it important to develop awareness of our own egocentrism? *Why* should we work hard to understand others' perspectives even when we are inclined

to disagree with them? *Why* must we withhold judgment until we are certain that we fully understand the assumptions and implications of an argument? *Why* is it important that we search diligently and widely for information before drawing conclusions? What kind of people do we want to be – as students, as researchers, as professionals, as spouses, as parents? How do we handle information and claims, draw conclusions, and treat those with whom we disagree? Determining answers to these implied questions assumes an enhanced importance when it becomes clear that we are ultimately training our students to become fairminded, productive, ethical citizens; logical thinkers; and rational consumers of information.

While my instruction in the traditional Writing 102 courses reflected an emphasis on macro-abilities such as comparing analogous situations, generating or assessing solutions, reading critically, and analyzing arguments, the affective, ethical dimensions of cognitive development were almost completely excluded from the course, with the exception of some discussion of ethical integrity in incorporating borrowed information into papers. My Writing 102 course description emphasized some skills aligned with macro-abilities such as constructing arguments and understanding “writing as problem-solving,” and individual units in the course focused on micro-skills such as “writing and revising paragraphs,” “constructing thesis statements,” and “using and citing sources” – all important skills, but all largely taught outside of a context of fairminded thinking. Conversely, my instruction in CRTW 201 (our critical-thinking and research-writing course) begins with a reflection on our own innate egocentrism and a consideration of the concept and practice of metacognition. Students begin the course by reading David Foster Wallace’s (2005) Kenyon College graduation speech “This Is Water,” a provocative text focused on our relentlessly egocentric response to the world around us,

and reflect in class discussions and writings on the implications of choosing to cultivate metacognition and compassion in our lives. What is truly at stake when we deliberately choose to decide “what has meaning and what doesn’t,” to reject “our natural default setting” of intellectual arrogance, and to develop “just a little critical awareness” about ourselves and our assumptions (Wallace, 2005, para.10, 19, 7)? What does it mean to master one’s own mind rather than let it function as the “terrible master”? Why does Wallace equate such mastery with true freedom?

Students follow this line of inquiry with a study of the impediments to critical thinking outlined in Gerald Nosich’s (2012) text *Learning to Think Things Through: A Guide to Critical Thinking Across the Curriculum*, including egocentrism, and apply these concepts in an essay in which they analyze a past mistake or current belief using the elements of reasoning or the impediments to critical thinking. Early in the semester, it becomes clear to students that the central focus of this course is significantly different from typical research writing courses they may have taken in the past. Before students are asked to analyze claims, investigate topics, or assemble data into arguments, they are required to think about how they think, how they draw conclusions, and what hinders them from reasoning and analyzing in ways that are fairminded, ethical, or logical. Whether they are reading texts by Paul and Elder, Nosich, Wallace, or Tavis and Aronson, students are confronted repeatedly with the same provocative claim: we humans are inherently and deeply mired in an egocentric viewpoint, and we are naturally wired to justify our own preconceived assumptions and beliefs even in the face of disconfirming evidence.

Modifying My Classroom Instructions and Assignments: The Impact on Students

And yet, there is hope. Students in a course based on Paul’s framework of critical

thinking are equipped not only to recognize and sometimes thwart their own egocentrism, but to employ specific strategies that foster Socratic analysis and fairminded thinking. Throughout the course, students apply the elements of reasoning and the standards for critical thinking to their own conclusions, to their peers' claims, and to arguments in non-fiction texts, articles, and TED Talks. They further examine their own tendency to engage in confirmation bias by completing an exercise in which they must thoroughly and fairly analyze the beliefs of someone with whom they profoundly disagree (Nosich, 2012, p. 70), after which they read Tavris and Aronson's (2012) *Mistakes Were Made (but not by me)*, an extended analysis of the ways in which our own brain can trick us into thinking that we are being fairminded and logical when we are decidedly not. Students gradually begin to understand that cognitive strategies such as analysis and evaluation are deeply rooted in and dependent on the affective traits of intellectual integrity and fairmindedness. The essential intellectual character traits, outlined in Elder and Paul's (2014) *The Miniature Guide to Critical Thinking Concepts & Tools*, are emphasized in the course, and students

are asked to demonstrate their understanding of these traits by incorporating them into their research paper analysis and final-exam essay assignment. While both writing courses require students to construct and evaluate evidence and claims, engage in academic research, and construct coherent written arguments, only an integration of Paul's conception of critical thinking provides a framework for these skills that clearly places them in a meaningful ethical context. The Paulian critical-thinking framework reveals why we learn these skills and what it looks like when we embody them. More importantly, it reveals what is at stake when we employ these skills fairly and ethically, or, conversely, when we choose not to.

Perhaps most representative and indicative of the changes in emphasis between the Writing 102, the traditional argumentative-writing course and CRTW 201 the enhanced course aimed at critical writing and thinking, the research paper assignment reveals a stark contrast in purpose. Here is the culminating research-paper assignment in the Writing 102 course:

Writing 102 Research Paper Assignment

ASSIGNMENT DESCRIPTION: The research paper assignment will “ask you to pose a question worth exploring, to read widely in search of possible answers, to draw conclusions, and to support those conclusions with well-documented evidence” (Hacker 207). Your research paper will be persuasive and argumentative rather than merely informative. However, your argument, or thesis, will rest primarily on your evidence. Your thesis should reflect and be supported by your research findings. Your sources should be relevant and credible, and you should handle your sources with care and with integrity. This assignment will differ slightly from our previous assignments in that it will emphasize your careful assimilation of various sources into one cohesive and persuasive argument. Your paper should inform your readers of the intricacies of a topic you have carefully chosen and researched, but it should also have a persuasive point.

TOPIC: You may choose any topic of interest for your research paper as long as it is appropriate for a collegiate audience. I encourage you to choose a topic in which you feel invested or one that interests, concerns, or puzzles you. Once you have chosen a topic, you must narrow it down in scope (probably drastically). Remember that an eight-to-ten-page paper cannot fully and completely address a broad or generalized topic.

SOURCES: You must include **one primary source** and **at least five secondary sources**. I encourage you to use more secondary sources if your topic and thesis could benefit from wider research. You must cite in your paper at least six different sources, although you may create a much larger working bibliography. **You may not use more than two Internet sources. All other sources must be books, periodicals, hard-copy articles, etc.**

CRTW 201 Research Paper Assignment:

Part One: Part One will consist of a minimum seven-page researched position paper on the topic below, will be persuasive and argumentative rather than merely informative, and will be structured as a special type of argument called a *classical argument*. That is, your paper will contain an introduction with a clear, assertive, and narrow thesis; a narration section; a confirmation section, a concession and refutation section; and a conclusion. *You must include a discernible and persuasive concession and refutation section in the paper.* You should narrow your topic considerably, and present a clear stance, or position, on your topic. Your argument should be narrow, focused, and assertive, and you must include the best points of your opposing side and refute them in your concession/refutation section.

Paper Topic: George Orwell writes, “We are all capable of believing things which we know to be untrue, and then, when we are finally proved wrong, impudently twisting the facts so as to show that we were right.” This research paper assignment will provide an opportunity for you to examine, research, and analyze an event or situation in your academic discipline in which critical thinking went badly awry. Our world is filled with such situations – in our communities, schools, families, and in geo-political conflicts, politics, businesses, public policy decisions, popular culture, etc.

This paper will enable you to engage in a process of “cognitive forensics” or “cognitive archeology”: choose one such situation in your disciplinary area or future professional area and examine what went wrong. How, exactly, did mistakes in thinking happen? What **impediments** to critical thinking were operative? What **elements of reasoning** were dismissed or ignored? Were any **standards** missing or inoperative in the decision-making process? What **intellectual character traits** were absent in those making decisions? Where do you see evidence of cognitive dissonance, self-justification, the Pyramid of Choice, or other forms of dissonance-reducing measures?

Even a brief glance at this assignment reveals a number of violations of the “six forms of decision-making in designing instruction” advocated by Richard Paul (2012a) in his essay “The Art of Redesigning Instruction” (pp. 334 – 335). First, the assignment lacks precision in its articulation, and students are given no suggested topic, question at issue, or direction for inquiry. Paul encourages teachers to “get clear about what the students have to reason about” and “express, as specifically and clearly as you can, the precise question at issue” (2012a, p. 334). Second, the topic fails to provide students with a “bridge or crutch,” something that “students are already familiar with” to “help them learn what they are not familiar with” (2012a, p. 334). Generally, the language of the topic lacks precision, clarity, and specificity (“any topic of interest”; “argumentative rather than merely informative,” etc.). The assessment of the paper lacks any reference to how students are “expected to use critical thinking abilities” in their research (Paul, 2012a, p. 335), and

nothing in the paper topic points students toward introspection, self-assessment, or metacognition about the process of researching a complex topic. Finally, though students are encouraged to “handle [their] sources with care and integrity” and though some classroom time was devoted to addressing the ethical and correct use of borrowed information in research papers, the class lacked an overall framework for making a case for the ethical use of information. Students were asked in this assignment to engage in a sophisticated and challenging intellectual task requiring the critical reasoning and analysis, as well as the assessment, interpretation, and synthesis of sources, and yet they were not provided with the powerful tools of the elements of reasoning, the standards for critical thinking, or the underlying framework of the intellectual character traits to propel their effort and equip them to produce a sound and well-supported argument.

After integrating Paul’s approach to critical thinking into our redesigned CRTW

course, I found that my purposes and goals in designing classroom instruction and assignments were sharpened and my focus in my instruction shifted away from macro- and micro-skills and toward getting my students to “reason while learning, in order to learn well and deeply” (Paul, 2012a, p. 334). The elements of reasoning and the standards for critical thinking became foundational tools for my students to use in completing classroom tasks and activities, always with the larger goal of practicing and improving their critical-thinking skills. The research paper became yet another opportunity for students to practice these skills, but it also offered an ideal vehicle to teach ethical, fairminded thinking, resulting in an assignment designed to invite both self-analysis and authentic research on a complex topic:

This CRTW paper topic, the culminating writing assignment in a series of lessons and assignments on Paulian critical thinking, research methods, logical fallacies, construction of arguments, and critical analysis, reflects a focus on self-analysis and metacognition and provides students with a more precise question at issue. It attempts to articulate clearly “what the students have to reason about” (Paul, 2012a, p. 335) and uses as a “bridge” the familiar text of *Mistakes Were Made* and the concept of the impediments to critical thinking. Conceptual categories are highlighted by asking students to analyze choices in terms of the impediments, elements, and standards, and students are encouraged to adopt the point of view of a researcher engaged in “cognitive forensics.” It incorporates the language of the standards for critical thinking into the assessment criteria, and it requires students to engage in self-reflective analysis of their own thinking and research methods (“Part Three”). It requires “opportunities for students to gather information on their own” (Paul, 2012a, p. 336), while still focusing students on a familiar and relevant context (critical thinking mistakes within their own

academic discipline). Though my students produce papers of varied degrees of strength and weakness in response to this topic, just as they did in response to the Writing 102 topic, the assignment itself requires the intellectual “moves” I want them to master in reasoning through a complex topic, incorporating and handling disconfirming evidence in an argument, and assessing and articulating the strengths and weaknesses of their own critical thinking and analysis. Often energized by the opportunity to research a critical-thinking mistake in their chosen discipline or future profession, students consistently submit research papers vastly more complex and thoughtful than those I used to receive in my Writing 102 courses.

Perhaps most important here is the context not explicitly stated in this CRTW research paper topic, but which supports this assignment and the tasks it requires: the cultivation of the intellectual character traits, the awareness of our own egocentrism, and the commitment to fairminded thinking and authentic research. Throughout the semester, students are taught how to draw conclusions in ethical, logical, and fairminded ways. They read examples of unethical and egocentric thinking in *Mistakes Were Made*, and they confront their own biases in classroom activities, paper topics, and written “thinking journal” assignments. Though they are not always entirely successful at completely eliminating confirmation bias in their research papers (who among us is?), they display a remarkable ability to identify and analyze such bias, and to see themselves as people who “struggle daily” against their innate egocentrism.

In the reflective self-analysis portion of his spring 2016 CRTW research paper, for instance, one student noted:

I firmly believe that my research and writing process, in terms of the critical thinking ideas that Nosich

discusses, has greatly improved this semester . . . my final research paper was characterized by a more objective view of the scholarly articles and evidence, rather than what I previously understood about the New Coke fiasco. While some confirmation bias may be present in my thinking without me realizing it, . . . my views on the marketing disaster have actually been changed from what I previously thought . . . [and] I think that my openness to seeing a different perspective regarding poor critical thinking allowed me to learn these new truths and not defend the consumers. (CRTW Student Self-Analysis, 2016)

Another student noted:

Being cognizant of the impediments to critical thinking that Nosich lists, I was able to steer clear of many that I usually fall subject to . . . In the initial research stages of the paper I immediately began to search for quotes that could implicate Governor Pat McCrory in a web of cognitive dissonance. This method, however, was unfruitful, and I had to take a step back and realize [my] confirmation bias [in order to] analyze any and every piece of writing on McCrory's statements. (CRTW Student Self-Analysis, 2016)

Ultimately, this student integrated disconfirming evidence into a complex and nuanced argument "rather than finding sources that would confirm [his] belief" (CRTW Student Self-Analysis, 2016).

In almost every submitted self-analysis, students identified their own tendency to engage in confirmation bias, recorded their struggles against this bias, and analyzed their efforts to conduct research in authentic and fairminded ways. One student noted, for instance, that she "was about to fall into the

same trap that many nutritionists have for years by ignoring contradictory evidence," and yet she persisted in researching in an open-minded way, noting that "the further [she] looked into the research the more certain [she] was that [she] could not be certain" about her initial hypothesis (CRTW Student Self-Analysis, 2016). Another student, who found herself "shocked" at the amount of disconfirming evidence she uncovered, ultimately admitted, "I could have been more intellectually empathetic and fairminded throughout the process. . . . I should have been looking for more counter-arguments earlier"; her analysis ended with her realization "While I like accumulating different viewpoints and interpretations, my confirmation bias can skew my findings and make me blind to important counter-arguments" (CRTW Student Self-Analysis, 2016).

VI. Concluding Thoughts

Those of us who teach the required CRTW course at my institution strive to construct, modify, and adapt our assignments and strategies to achieve our common purpose and goal: encouraging students to reason their way through difficult, complex material and equipping them to think things through in ways that are authentic, logical, ethical, and fairminded. When I began to incorporate the Paul/Elder framework of critical thinking into advanced research writing courses, I thought that I might find a few helpful nuggets of insight or perhaps stumble upon a couple of valuable techniques to pass on to my students. I had no idea how much the understanding and integration of this method would fundamentally change me as a teacher and thinker, how much it would transform my classroom and assignments, and how much it would radically shift my instructional approach from one based on a skill-and-task-centered, didactic instructional paradigm to one motivated by an ethically-grounded, purpose-driven, student-focused paradigm. My students' eventual awareness of their own

egocentrism and their tendency to display confirmation bias and sophistic thinking reflect, from my perspective, an immense cognitive leap forward. Even professional scholars study disciplinary subjects for decades without developing such self-awareness, trapped in intellectual prisons constructed of their preconceived paradigms and assumptions.

My students and I owe a great debt to Richard Paul for his clear articulation of a substantive, transferable method of critical thinking that cultivates strong-sense character traits such as fairmindedness, intellectual empathy, intellectual integrity, and intellectual humility. One student's anonymous course evaluation comment reflects the gratitude expressed by many CRTW students at the end of each semester: "This course has definitely helped me as critical thinker in terms of my metacognition, being aware of my thinking. It has put me in a position to challenge myself and my impediments in order to be a better student and a better person overall" (CRTW Student Course Evaluation, 2012). I, too, believe that I have become a "better person" by practicing and implementing Richard Paul's approach to critical thinking in my teaching, my scholarship, and my personal life. The application of Paul's framework for critical thinking has enabled me to design assignments that move beyond the acquisition of micro- and macro-skills in writing and research and that encourage the cultivation of Socratic, fairminded thinking and self-awareness in my students. Though Paul and Elder (2006) remind us that "any progress toward fair-mindedness is a constant inner struggle, a struggle to be faced each and every day" (p. 6), such efforts are often rewarded with "a mind that is self-disciplined, that cannot easily be manipulated, that is able to see the truth, and that strives at all times to think fairly" (p. 6); such a mind, eagerly receptive to new ideas and resistant to intellectual arrogance, is truly a reward of "rich and inestimable" value (Watts, 1741/1821, p. 3).

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Appendix A: The Elements of Reasoning

- 1) **Purpose** – goals, objectives, missions
- 2) **Point of View** – frame of reference, perspective, orientation
- 3) **Question at Issue** – problem to be solved, issue in question
- 4) **Information** – data, facts, observations, experiences
- 5) **Conclusions** – interpretations, inferences, solutions
- 6) **Concepts** – theories, definitions, principles, models, axioms
- 7) **Assumptions** – presuppositions, beliefs taken for granted
- 8) **Implications and Consequences** -- likely or necessary outcomes

Also consider **Alternatives**: What is missing? What else should we consider? What other perspectives could we adopt? What other conclusions could we draw?

Taken from Elder and Paul, *The Thinker's Guide to Analytic Thinking*, p. 5.

Appendix B: The Standards of Critical Thinking

Clarity	Could you elaborate? Could you give me an example? Could you illustrate what you mean?
Accuracy	How could we check on that? How could we find out if that is true? How could we verify or test that?
Precision	Could you be more specific? Could you give me more details? Could you be more exact?
Relevance	How does that relate to the problem? How does that bear on the question? How does that help us with the issue?
Depth	What factors make this a difficult problem? What are some of the complexities of this question? What are some of the difficulties we need to deal with?
Breadth	Do we need to look at this from another perspective? Do we need to consider another point of view? Do we need to look at this in other ways?
Logic	Does all this make sense together? Does your first paragraph fit in with your last? Does what you say follow from the evidence?
Significance	Is this the most important problem to consider? Is this the central idea to focus on? Which of these facts are most important?
Fairness	Do I have any vested interest in this issue? Am I sympathetically representing the viewpoints of others?

Taken from Elder and Paul, *The Thinker's Guide to Analytic Thinking*, p. 9.

Appendix C: The Intellectual Character Traits

- Intellectual Humility:** Having a consciousness of the limits of one's knowledge, including sensitivity to circumstances in which one's native egocentrism is likely to function self-deceptively; sensitivity to bias, prejudice and limitations of one's viewpoint.
- Intellectual Courage:** Having a consciousness of the need to face and fairly address ideas, beliefs or viewpoints toward which we have strong negative emotions and to which we have not given a serious hearing.
- Intellectual Empathy:** Having a consciousness of the need to imaginatively put oneself in the place of others in order to genuinely understand them, which requires the consciousness of our egocentric tendency to identify truth with our immediate perceptions of long-standing thought or belief.
- Intellectual Autonomy:** Having rational control of one's beliefs, values, and inferences. The ideal of critical thinking is to learn to think for oneself, to gain command over one's thought processes. It entails a commitment to analyzing and evaluating beliefs on the basis of reason and evidence, to question when it is rational to question, to believe when it is rational to believe, and to conform when it is rational to conform.
- Intellectual Integrity:** Recognition of the need to be true to one's own thinking; to be consistent in the intellectual standards one applies; to hold one's self to the same rigorous standards of evidence and proof to which one holds one's antagonists; to practice what one advocates for others; and to honestly admit discrepancies and inconsistencies in one's own thought and action.
- Intellectual Perseverance:** Having a consciousness of the need to use intellectual insights and truths in spite of difficulties, obstacles, and frustrations; firm adherence to rational principles despite the irrational opposition of others; a sense of the need to struggle with confusion and unsettled questions over an extended period of time to achieve deeper understanding or insight.
- Confidence In Reason:** Confidence that, in the long run, one's own higher interests and those of humankind at large will be best served by giving the freest play to reason, [and] by encouraging people to come to their

own conclusions by developing their own rational faculties.

- **Fairmindedness:** Having a consciousness of the need to treat all viewpoints alike, without reference to one's own feelings or vested interests, or the feelings or vested interests of one's friends, community or nation; implies adherence to intellectual standards without reference to one's own advantage or the advantage of one's group.

Taken from "Valuable Intellectual Virtues" (September 2014). Foundation For Critical Thinking. Retrieved from <http://www.criticalthinking.org/pages/valuable-intellectual-traits/528>

Appendix D: The See-I Strategy

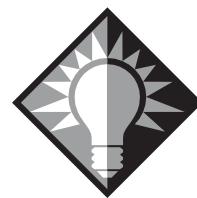
The SEE-I Strategy Includes the Following Steps for Clarification and Amplification of Ideas:

- 1) **State** – In one to three sentences, clearly and explicitly state your position or claim, or clearly define your term or concept. Be clear, precise, and brief.
- 2) **Elaborate** – In one to three paragraphs, elaborate on your claim or definition. Explain what the concept is, what it is not, where it occurs, how it developed, why it is important. Clarify when and where it operates and how it is limited in its application. Explain how it works, how it developed historically, what experts think about the concept, etc. You may begin this section by stating, "In other words"
- 3) **Exemplify** – Provide one or more concrete examples of your claim, definition, or concept from literature, history, your own life, society, etc. These examples should be concrete and specific, and you should provide

sufficient explanation to make the reader certain of how the example represents the concept. You may begin this section by stating, "For example" or "for instance" You may include as many concrete examples as you wish to support your claims.

- 4) **Illustrate** – Provide a metaphor, simile, diagram, illustration, or image which represents your abstract concept, idea, definition, or claim. These metaphors should function as true representative images rather than concrete examples, and can be linguistic or visual. This section can be omitted from the SEE-I if necessary, but remember that in many contexts readers benefit from metaphors or illustrations of concepts. You may begin this section by stating, "It's like . . ." For example, you might state, "Civil disobedience is like a lighthouse in the midst of a storm, providing clarity and direction in the midst of social upheaval."

Taken from Gerald Nosich, *Learning to Think Things Through*, pp. 30 – 33



Portaging Richard Paul's Model to Professional Practice: Ideas that Integrate

by Robert Niewoehner

Abstract

Richard Paul originally developed and disseminated his approach principally through venues targeting K-12 and university education. Together with Linda Elder he sought to ground a culture of critical thinking. Paul and Elder, in collaboration with this author, then extended their approach into the professional practice of engineering. The *Engineering Reasoning Thinker's Guide* contextualized the model for engineers. Though intended for engineering students, it resonated with engineers in industry practice, providing a pattern for other guides, such as *Clinical Reasoning*. Presuming familiarity with the components of Paul and Elder's approach, this article demonstrates their approach's applicability to and utility in domains of professional practice, whether engineering, medicine, law, or business. Their approach provides a framework for conceptualizing, synthesizing, and applying material from disparate domains in popular business literature. Organizations that embrace Paul and Elder's vocabulary will improve the collective thinking skills of their entire work-force. Paul and Elder's approach provides ideas that *integrate*.

Keywords: critical thinking, professional, engineering

Introduction

An undergraduate student provoked my interest in critical thinking. I had practiced engineering professionally for twenty years and was adapting to teaching undergraduate engineers. Grading this senior's semester project distressed me. A month short of graduating near the top of his class, from a difficult program, his written work lacked evidence that he could reason. I had come from the work world into which he was headed, and I knew that his future supervisors would need him to think well, more than any other skill we imparted to him. I had recently been one of those hiring bosses. Yet, we had allowed this ostensibly good student to get through our program without demonstrating in a project that was supposed to represent his pinnacle academic achievement that he could *think*.

My distress led me to the work of Richard Paul. First, I wanted to know how to reorient my teaching to foster the

development of students' thinking skills. Second, as an institutional leader, I wanted to understand how our institution could improve the apparent defect I had observed in that student's education. At home, my concern further included teaching my four then-young sons to think well. Reading Paul's early work and watching his workshop videos convinced me of that work's general applicability to my teaching. So, I went to California to take a week-long workshop with Richard, Linda Elder, and their collaborators.

My epiphany occurred during the second day in a "Socratic Questioning" workshop, while paired with the Dean of Music from a mid-western university. In the middle of a task Richard had given us, my partner exclaimed, "This is so relevant to what I teach!" I replied, "Well, this is really relevant to what I teach, and our subjects could not be more different." I shared the identical conversation the following day with a Chairman of Pediatrics from a Canadian medical school, after which I remarked,

“There’s something powerfully portable here.” I was particularly struck by Paul’s exhortation to “Focus on ideas that integrate.”

The following year, I met with Paul and Elder in their home to discuss adapting for engineers their *Scientific Thinking* (2015). Linda cornered me, asking, “How has using this model changed the way you personally think?” Taken aback, I realized their model was changing not simply how I teach, but how I think. I eventually reached an answer that appeared to satisfy them both, and we completed *A Miniature Guide to Engineering Reasoning* the following year (Paul, Niewoehner and Elder, 2006).

The publication of that Thinkers’ Guide revealed other constituencies I had not expected. I had contributed to *A Miniature Guide to Engineering Reasoning* believing it would fill a gap in engineering education (Paul, Niewoehner, and Elder, 2006). I did not expect the reception extended by supervisors and leaders in diverse engineering workplaces who were concerned for the continued intellectual development of their technical workforce. Indeed, it is easy to find business leaders identifying critical thinking skills as among the attributes they most need in today’s workforce (Wagner, 2010).

In the ten years since, I’ve interacted with many organizations seeking to apply the Paul-Elder approach to their daily work. As my own teaching has drifted more towards technical business leadership, I’ve been attentive to alignment of their work with that of other authors, particularly those writing in the business and technology sectors. In the examples and cases that follow, I intend to illustrate the portability of the Paul-Elder approach into domains far afield from Paul and Elder’s direct educational reform, while within the broad scope of their hoped-for impact. In these cases, I’ll assert that the critical

thinking model has spurred my apprehension and application of what others have written, and has enriched the tools and models offered by others. Even with the books I’ve read this summer, Paul and Elder’s model has provided a framework for me to organize and more easily remember what I’ve read and learned. The Paul-Elder approach has proven to be “Ideas that Integrate.”

Overview of the Paul Model

I’ll trust that others in this issue have provided fuller discussions of the Paul-Elder approach to critical thinking. The model is described in several full-length books, as well as scores of booklets which they call *Thinkers’ Guides* (e.g. Paul & Elder, 2006). Hence I will only briefly summarize their approach, describing those adaptations that I have found assist its contextualization to professional practice.

Before I review the Paul-Elder approach, I should comment on the value of a general model of thinking. Coincident with his retirement from Harvard’s Graduate School of Education, David Perkins summarized his forty years leading research into thinking and learning (2013). Perkins reported that a variety of thinking organizers have been demonstrated to show significant impact on and transfer of targeted thinking skills. “Not only can [we improve thinking], it can be done in a variety of successful ways. What they have in common is thinking organizers.” Paul and Elder’s model is one such thinking organizer.

Perkins challenged his audience on five points relating to the use of thinking organizers. First, learners need explicit instruction in their use. Second, thinkers need a metacognitive framework for recognizing when particular thinking skills apply. Third, thinking organizers are best when socialized, meaning that they’ve become

embedded in a group's *common vocabulary*. Fourth, Perkins refuted claims that thinking skills are discipline-specific, insisting they're universal, while acknowledging they should be "situated." Paul, Elder and I described *Engineering Reasoning* as a "contextualization" of their approach for engineers. Finally, Perkins insisted thinking organizers couldn't be divorced from "thinking dispositions" and called for further study in this domain. Paul and Elder's Intellectual Virtues instantiate and explicate the dispositions Perkins stressed.

My own conception of critical thinking has been instrumentally shaped by Paul and Elder's definition: "Critical thinking is that mode of thinking—about any subject, content, or problem—in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them." But, Paul would have been the first to insist that I express this in my own voice, with personally meaningful examples.

I define critical thinking as the deliberate assessment of our own thinking which seeks to improve our thinking and which spans our reception and analysis of what we hear and read from others. *Critical thinking intentionally questions itself*. In other words, two processes work in parallel. The first organizes our thoughts and information to answer our questions, the goal of our thinking. The second parallel process simultaneously questions the health and quality of our thinking in the first process with the goal of its refinement and improvement.

The flight control systems of today's commercial airplanes illustrate these parallel processes. For safety, the flight control computers are typically quad-redundant, meaning most of the vital components have four identical copies, physically distributed

so damage to one doesn't damage them all. Hence, four identical sensor packages share their measurements with four computers, which route commands via four independent wire bundles. Thus individual component failures cannot cause the whole system to fail. Thousands of times each second, all four computers observe their sensors and the control inputs and independently calculate where the rudder should next be commanded. Together, they command the rudder to move.

But the flight control system does more than calculate new control positions. In parallel, with every computer clock-frame, those same four computers repeatedly ask one another, "Do we agree? Do we agree? Do we agree? Do we agree?" If one computer or component disagrees with the other three, then its health is doubted and the system ignores the errant computer or sensor, literally voting it off the data bus. *The primary process controls the airplane; the second process monitors the health of the first*. The health monitoring process protects *the system's decisions* from failure, ensuring its integrity, safeguarding the airplane, its passengers, its crew.

Critical thinking monitors and questions the health of our thinking, whether as individuals or as teams. When we *observe*, critical thinking challenges the data's validity. When we *organize the data*, critical thinking warns us of our biases and blind spots. When we *assume*, critical thinking reveals and challenges assumptions. When we *conceptualize*, critical thinking prompts us to consider alternative mental models. When we *interpret*, critical thinking reminds us of other points of view. When we *communicate* by talking or writing, critical thinking requests clarification and refinement. Critical thinking seeks the immediate quality and long-term refinement of our thinking as individuals. Likewise, in the organizational context of teams, critical thinking seeks the enhancement of team learning and performance.

If critical thinking monitors the health of our thinking, what are the particular questions it should ask? A practical model of critical thinking should provide a schema for asking vital questions.

Questioning skills appear frequently in the business literature as vital to business success, particularly in domains dependent on innovation. Research by Dyer, Gregersen, and Christensen found that dozens of prominent innovators excelled at three of five distinct leadership skills: Questioning, Observing, Networking, Experimenting, and Associating (2011, 29). These innovators' productivity did not depend on having all five skills; strength in three sufficed, yet every one of the innovators excelled at Questioning. Questioning was the indispensable skill.

Many companies have embraced "Action Learning" as a method for problem solving and for leadership development in focused problem-specific sessions (Marquardt, 2011). Action Learning's core practice is simple: "statements are only allowed as a direct answer to a question." Questions therefore ground the process, and the quality of the questions determines the quality of the outcomes. Some practitioners/proponents explicitly embed the Paul-Elder approach in Action Learning as a means to boost organizational competency (DeLeon, 2012).

Some of my friends regard Marquardt's *Leading with Questions* as one of their favorite business books (2010). An Action Learning advocate, Marquardt, urges leaders to develop their inquiry skills, over against the advocacy skills that might likely have been responsible for their rise to leadership.

Personally, however, I reacted to *Leading with Questions* in the same way I reacted to reading Mortimer Adler's classic *How to Read a Book*: I would need to carry these books with me to implement their suggestions. The detailed approach in the

books was excellent, but it was difficult to portage. However, I wouldn't need to carry the books if I had a schema for asking great questions, regardless of the discipline. The Paul-Elder approach constitutes a schema for growing towards expertise in asking questions, whether in my classroom, at my dinner table, or in a business meeting.

Paul and Elder's approach is comprised of four dimensions. The Elements of Thought span the substance of our thinking. The Intellectual Standards provide universal criteria against which thinking should be judged. The Intellectual Virtues describe the traits or habits of mind of a critical thinker. The barriers of egocentricity and sociocentricity are the main Impediments to Critical Thinking. Paul frequently characterized question-asking from these four dimensions as "basic intellectual moves." The sub-sections below describe the minor amendments I make in order to contextualize the model for professional/business settings.

1.1. *The Elements of Thought*

Paul asserts that *all* thinking entails eight elements, whether or not they're explicit. We think for a *purpose*, with some immediate *question*. Our *point of view* entails *assumptions*. *Mental models* or *concepts* organize the *information*. A *conclusion* answers the question and has *implications*. Disproving Paul's assertion would merely require imagining some line of thinking in which one of the elements is absent, but so far I have not found one.

Paul insisted there is no particular order to these elements; they work as an ensemble, constituting the elements of our thinking on a subject. While I agree, I also remember the natural pairings above as an aid to my memory. Moreover, this order reinforces the inductive line of reasoning commonly found in technical writing. I started my abstract above

with a bullet list of the Elements of the paper I intended to write. I thence turned those bullets to prose, combining them and re-ordering them for readability.

I slightly amend Paul's model by complementing 'concepts' with 'mental models,' a term emerging from the cognitive sciences and popularized in business contexts by Peter Senge's *The Fifth Discipline* (2006, 166ff). Modern cognitive science has validated Aristotle's classical insight, "The soul never thinks without a mental image [*phantasma* in Greek]." Mental models in particular have received attention in the recent literature on innovation and creativity.

We now know we reason with mental models. Within the cognitive sciences, competing theories of the late 20th century surrendered to the current understanding of our thinking, where thinking simulates events with mental models (Johnson-Laird, 2006). In *The Mind's New Science*, Howard Gardner (1985) remarks, "the major accomplishment of cognitive science has been the clear demonstration of . . . a level of mental representation." The mind manufactures models. Phillip Johnson-Laird pioneered much of this work, publishing *Mental Models* in 1986, followed by *How We Reason* in 2006. Johnson-Laird (2006, 165) explains, "Our capacity to hold things in mind is limited, and so we tend to reason with mental models."

Given that you and I think in models, mathematician George Box (2005) warns: "All models are wrong. Some models are useful." But "Don't fall in love with a model." Here, Box addresses those who work with statistical models, but his exhortations apply equally to anyone who desires to think well, once we realize that our reasoning employs mental representations. If we're mindful that our mental models are mere *representations that we've constructed*, then we will be attentive to the fact that appropriate alternative models may exist, and that it is

likely that our teammates, customers, or professors are working from mental models different than our own. In *Thinking in New Boxes*, De Brabandere and Iny (2013, 276) note, "Concepts must be identified because conceptual frameworks empower, but they can also constrain." The most successful models of the past may obscure the models that will promote future success or innovation.

Both the frequency with which "mental models" now appears in the business and innovation literature and the concept's grounding in the cognitive sciences commend amending Paul's nomenclature to anchor this valuable insight in the framework of the Elements of Thought. Paul's approach then draws attention to mental models as one of the eight elements of our thought, rather than as an entity that stands alone in import. Thereby his approach grounds discussions of mental models in a broader, more robust framework of thinking. Focus on the Elements of Thoughts in this way provides an idea that integrates.

1.2. Intellectual Standards.

A survey of intellectual values going back to Greek antiquity reveals universal standards for qualifying good intellectual work, whether in the arts, sciences, or humanities, and regardless of the language. Paul and Elder's *Intellectual Standards* (2008) treats the subject wonderfully. They acknowledge that their lists are not comprehensive (or consistent across their publications), that some disciplines might place more or less emphasis on particular standards, and that a discipline might prefer a synonym. I contend that *for organizations, whether schools or businesses, the power of intellectual standards emerges from having a common vocabulary for good intellectual work.*

I teach to the following list of standards, with several adjustments and additions from the list found in *Engineering*

Reasoning.

- Clear
- Precise
- Relevant
- Fair
- Concise
- Broad
- Significant
- Systemic
- Accurate
- Deep
- Logical
- Complete

While Paul and Elder typically catalog the standards as nouns, I prefer adjectives, grammatically emphasizing how the standards qualify the Elements of Thought: e.g. a *clear* purpose, a *significant* question, *accurate* assumptions, a *logical* conclusion.

My two additional standards are *concise* and *systemic*, whose inclusion I will explain and defend, and I will also identify a major application of the standards that first appeared in *Engineering Reasoning*. First, concision serves clarity as a hand-maiden. They routinely appear ensemble in corporate writing manuals, or even the FAA's guide to radio communications; "clear and concise" are almost inseparable. The pantheon of great communicators exhort concision. Homer linked these thoughts (Krieger, 2002), "Few were their words, but wonderfully clear." Cicero warns (Wickham, 1903, 357), "Every word that is unnecessary only pours over the side of a brimming mind." Thomas Jefferson (1814) counseled, "The most valuable of all talents is that of never using two words when one will do." I first included *concise* after repeatedly observing that the poorest student

work was often too long just as often as it was too short. Including concision reminds my students (and me) to maximize the signal-to-noise ratio.

Second, I included *systemic* because of the importance of Systems Thinking. Systems Thinking rose to prominence because complex systems abound: technical, biological, ecological, financial, social, etc. Increasingly, we find ourselves frustrating our own efforts because our attempts to effect some change have systems implications that we have not contemplated. Systems can interact with their environment and with other systems in surprising ways; behaviors emerge that wouldn't have been anticipated. Who would have imagined, for example, that re-introducing wolves into Yellowstone National Park would change everything in the eco-system including the course of rivers? (Wolves). Systems Thinking has emerged as a science with applications spanning multiple fields, and system behaviors are at the root of many of our most vexing social and technological challenges (Meadows, 2008).

For several years, I treated *systemic* as a special case of the standards *deep* and *broad*. But, those two standards are already rich with significance, and I found their meaning was diluted if I lumped systems thinking with either. Thus, when I urge engineers to go deeper, I intend that they remove simplifying assumptions and increase the complexity of their analysis, and when I urge them to think more broadly, I'm asking them to think about alternative mental models, or think about problems from other stakeholders' viewpoint. In contrast, when I urge them to think systemically, I'm urging them to think about the connections of their system-of-interest with the world surrounding that system, those systems with which it must cooperate and those with which it will compete. Furthermore, I'm urging them to think about how the

world outside their system will react to their system—whether physically, socially, electronically, environmentally, etc. This calls for an independent standard.

Furthermore, in *Engineering Reasoning*, we explicitly extended the scope of the standards' application to graphical communication within the field of engineering. Business and technical communications depend on graphical evidence as often as on prose. In an age of "big data," stories emerge from trends that can frequently only be noted in graphical formats. Edward Tufte (1997, 53) highlighted the following paragraph as the single most important thought in any of his landmark books on graphical communications:

Visual representations of evidence should be governed by principles of reasoning about quantitative evidence. For information displays, design reasoning must correspond to scientific reasoning. Clear and precise seeing becomes as one with clear and precise thinking.

Though I had long delighted in Tufte's books, it was as I listened to him in a workshop that I realized, "If the standards are universal, they must apply to graphs and figures as they do to prose."

1.3. *Intellectual Traits and Virtues*

In his retirement address (Perkins 2013), David Perkins reserved his strongest message for the role of dispositions in intellectual behaviors, "The data is in; dispositions affect thinking behaviors much more than IQ." What Perkins called "dispositions" in his address, Paul and Elder label "traits and virtues." I prefer the latter term, as "virtues" emphasizes my moral obligation to aspire to them all, rather than remaining content with a disposition to exhibit one or two.

The intellectual traits and virtues include:

- Intellectual Humility
- Intellectual Integrity
- Intellectual Courage
- Intellectual Empathy
- Intellectual Perseverance
- Confidence in Reason
- Intellectual Autonomy
- Fair-mindedness
- Intellectual Curiosity

We added "Intellectual Curiosity" to the list in *Engineering Reasoning*, given the frequency it appears in descriptions of technical tragedy and success. The expression appears five times in the *Columbia Accident Investigation* report (Gehman et. al., 2013, e.g. 102), collectively representing a rhetorical lament, as if the Board were asking, "Where was the intellectual curiosity?"

Particular intellectual virtues are extolled in numerous best-selling business books. In *Emotional Intelligence* (2005) and *Primal Leadership* (2002), Daniel Goleman insists that intellect qualifies men and women for executive leadership, but *empathy* enables their success once there. Jim Collins' research for *Good to Great* highlights CEO *humility* as the best predictor of great companies' financial performance (2001). Edgar Schein insists *Humble Inquiry* belongs at the heart of leading learning organizations (2013). Matthew Syed's *Black Box Thinking* highlights innovation's dependency on innovators' attitudes towards failure, and their intellectual *perseverance* (2015). In a *Harvard Business Review* classic, Kim and Mauborgne emphasize "Fair Process" in managing knowledge workers: leaders need not give knowledge workers their way, but effective leaders must give them their *fair* say (1997). So, we see prominent business authors and researchers highlighting particular thinking

dispositions and virtues, consistent with Perkins's charge to contextualize dispositions.

The Paul-Elder framework emphasizes the set of virtues as collectively descriptive of the thinker I should strive to be. For many years, growth in humility was my greatest developmental need, while other traits came more naturally, such as autonomy, curiosity, and confidence in reason. As I made sluggish progress, two professional mentors urged me towards more empathy as a leader. Of course, hearing their thoughtful counsel gracefully challenged my humility. I acknowledged they were right—eventually. Subsequently, growth in empathy has been my personal project for several years.

Hence, the Paul-Elder articulation of virtues describes the dispositions I aspire to exhibit more completely than do any one of these other wonderful authors. Surely, as I read further, I'll find substantiated exhortation in some future author whose work I'll embrace and can readily weave into the structure Paul and Elder provide. Again, Paul and Elder's approach provides "Ideas that Integrate."

Among the organizations with which I regularly consult and teach, several routinely request workshops on intellectual virtues for their mid-career leaders. In a workshop on my campus, my then-18-year-old son was paired with a retired Navy admiral, who had recently served as Associate Administrator with NASA. I asked participants to recall and then share one positive and one negative personal story exemplifying the workplace power of *one* intellectual virtue. That night at dinner, I asked my son, "How was your time with Craig?" "Dad, you asked us for one positive story and one negative story illustrating a virtue. Do you realize that in that five minutes he'd listed a positive story and negative story for *every* single virtue?" "So, what did you take away?" "Virtue matters at work."

I urge you to watch and reflect on

Dr. Peter Attia's TED-MED talk (2013), "What If We're Wrong About Diabetes?" Then, ask yourself, "How were intellectual virtues evidenced in his talk?" He does not use the term "virtue"; he's talking medicine to an audience of medical professionals. Yet, his personal example movingly reinforces my son's observation on professional effectiveness: "Virtue matters."

Workplace Examples

In the examples that follow, I describe two issues in the business literature, and then illustrate how the Paul-Elder approach intersects with those issues, enriching the insight they provide. Furthermore, in each case, it is clear that proficiency with the Paul-Elder approach enables accelerated application of the counsel it offers.

1.1. Moving Teams from Advocacy Cultures to Inquiry Cultures

A team's approach to inquiry and advocacy influences both its creativity-and the commitment felt by team members toward team goals. This touches upon some of our most difficult conversations within professional teams and on challenges for project leaders. A team's approach to inquiry and advocacy distinguishes critical thinkers from competing colleagues.

First, creative teams need conflict. Pat Lencioni lists "Fear of Conflict" as the second of his *Five Dysfunctions of a Team* (2002). In my world, engineers commonly assemble teams with mixed expertise, both because we need the diversity of insights into problems and solutions and because it is through such teams that younger participants grow. The point of teams is not simply to divide up the labor, but more importantly to achieve outcomes that, as a consequence of breadth of insight and expertise, are greater than the sum of the parts. A team's problem may require expertise

from structures, electrical, and programming. The more ill-structured the problem, the more valuable the diversity of insights (Sawyer, 2007). The challenge is always to foster constructive conflict and avoiding the pitfall of unproductive conflict.

Furthermore, teams can descend into a number of decision-making dysfunctions. The strongest personality in the room may dominate, even bully, forcing their peers into a course of action (drafting others in their ascent up the ladder of inference). Social loafing or social fear may limit an individual's willingness to contribute. The team might prematurely rush to converge on an answer when more discussion might uncover better alternatives. Truly innovative ideas will commonly not be the first to the table; solution-driven engineers may rush to close on the first viable option, or on a legacy solution, rather than exploring the full opportunities of the design space. Worse, teams that over-value peace will be slow to converge and may choose the answer that makes everyone happy, rather than best answer to the problem. These are all artifacts of a failure to promote healthy conflict.

How can we distinguish between the conflict we want and the conflict we dread? Lencioni distinguishes *ideological* from *interpersonal* conflict, promoting the clash of ideas rather than of people. Garvin and Roberto (2001) call these *cognitive* and *affective*. Pixar's Ed Catmull (2014) describes a culture of safe ideological conflict as foundational to the artistic and commercial success of their movies.

How can we direct teams into clashing over ideas without butting heads? *Inquiry* promotes the former; *advocacy* encourages the latter. The table below summarizes the distinction, adapted from Garvin and Roberto (2001). Most of us with any experience in work or academic teams will recognize the advocacy team meeting, where conversation

devolves to the two most passionate voices in the room.

Observers who do not hear questions in a meeting know they are watching a team with an advocacy culture. In contrast, in a team with an inquiry culture the conversation will be characterized and shaped by questions, and an observer should note deep listening on the part of those not speaking. Inquiry cultures seek clarity and charity; advocacy cultures seek conquest.

The point is that proficiency in the Elements of Thought provides immediate proficiency in promoting an inquiry culture because team members always have eight great questions they can ask and countless more that emerge from the eight families of questions the elements represent. When presented with an idea that either you do not understand or with which you disagree, you can tease out the eight elements from your teammate's proposal. (1) "What assumptions underlie your proposal?" (2) "What stakeholders are you prioritizing?" (3) "What information do you think is most valuable?" (4) "Could you elaborate on your reasoning connecting the data with your conclusion?" (5) "What implications are you contemplating or seeking to avoid?" (6) "How do you define the problem at hand?" (7) "What organizational or customer need will this serve?" (8) "What conceptual foundation does your proposal embrace?" These questions are particularly important when a stalemate looms. Hidden assumptions and implicit mental models are commonly the unrecognized source of conflict; exposing these may diffuse the conflict, or reveal other unseen alternatives.

Similarly, when challenged by others in presenting our own ideas, the elements are again a resource in explaining our proposal. "I'm using data from" "I've assumed" "The following mental model is key to my thinking" "My rationale behind my conclusion was" "I believe the implications of this course would be"

Table 1 Decision Making Cultures

	Advocacy	Inquiry
Mental Model	A contest	Collaborative problem solving
Purpose	Persuasion/ lobbying	Learning
Participant's Role	Spokesperson	Critical thinker
Behaviors	Strive to persuade Defend your position Downplay weakness	Present balanced argument Remain open to alternatives Accept criticism
Minority Opinion	Discouraged or dismissed	Cultivated, celebrated
Outcome	Winners and losers	Collective ownership

So, whether needing to steer the room into inquiry or having been thrust into the role as an advocate, team members can ground their questions with the Elements of Thought. The use of the Elements broadens a team's consideration of the factors affecting their thinking.

The Intellectual Standards are a similar resource from which to draw good questions in team problem-solving settings. Bringing the Standards into the conversation sharpens the team's thinking. "What are the significant factors we should consider?" "How could we clarify our interdependence?" "Is this the most accurate information available?" "What emergent system behaviors are possible?"

One need not be the team leader to influence a team's culture towards inquiry. And though familiarity with the Elements and Standards is clearly helpful, such familiarity

is not absolutely necessary for all teammates. The embrace of and growth in the intellectual virtues will move the thinker personally towards an inquiry contribution rather than advocacy, whether or not their teammates grow with them.

Explicit strategies exist for fostering inquiry behaviors in teams. Action Learning is one such explicit protocol for promoting inquiry cultures through problem-solving team sessions, and it has been successfully embraced by numerous companies (Marquardt, 2011). While many books and workshops are available on the subject, the fundamental ground rule for an Action Learning problem-solving session is pretty simple: "Statements can only be made in answer to a question." The resultant dynamic during such sessions is very interesting.

My limited personal experience with

Action Learning sessions has been very positive. First, I find the protocol encourages intellectual virtues, notably intellectual humility, empathy, and fair-mindedness. Instead of devoting my attention to crafting a clever answer, I listen more intently to craft a perceptive question, building on what I have heard. Indeed, I may listen to others more intently in Action Learning groups than any other setting.

The shift from an advocacy culture in a team does not require certification in Action Learning. An undergraduate engineering student met with me weekly during a recent semester for mentoring in leading a capstone design team of a dozen classmates. His faculty supervisor expressed dismay in December about the team's stunted progress through the fall, yet in the spring reported that the team's productivity changed dramatically. When I asked the student what he'd done differently, he told me, "I quit telling my classmates what to do and resolved to lead solely with questions. I learned that they did not need me giving them answers; they'd needed me to guide them to devising answers." He had intentionally shifted his team's culture from advocacy to inquiry, and both he and his faculty mentors thought it decisive in bringing about greatly improved results.

1.2. Restraining the Rush to Judgment

We rush to judgment when we seize upon easy answers by creating a story that satisfies our preconceptions. Accident and incident reports in high technology sectors are replete with descriptions of thinking habits that failed professional organizations. We commonly draw conclusions that we believe follow directly from the evidence and we are inattentive to the influence of our assumptions on those conclusions or the extent to which we might have filtered the data by virtue of our point of view or mental models. Paul and Elder's approach provides technical

organizations such as mine with tools for developing the habits and traits of mind that are the antidote to the glaring missteps that grieve us. I will share several examples below, beginning with a "good news" story, in which intellectual virtue prevented an incident.

An industry flight test team shared their story of a near-miss at a 2014 industry safety conference (Bombardier, 2014). A demonstration test point for a twin-engine commercial airplane customer nearly ended in disaster. The test called for an abrupt throttle chop to idle on one engine coincident with the airplane lifting the nose for takeoff. It's a critical test because it is dangerous; the manufacturer has to prove that the airplane is controllable even with an engine failure at the worst possible moment. A fatigued, inexperienced co-pilot raised the nose ten knots early, well below the speed at which control was assured, and the pilot and copilot had to wrestle the airplane back into control, averting disaster. Everyone blamed the co-pilot; the test point was repeated with another crew; the customer was satisfied; the case was closed. No one noticed they had rushed to judgment.

One cautious manager remained unsettled, suspicious, and intellectually curious. Over the objections of those who wanted to move on to other work, he insisted they dig deeper into the incident. That deeper investigation initially raised more questions than answers, and further analysis revealed a software bug unmasked by an under-serviced nose-wheel. With a unique alignment of conditions, the software bug had prematurely indicated rotation speed to the co-pilot, who had acted perfectly in accord with the displayed information. The discovery of the bug exonerated the co-pilot. More importantly, this software load was flying worldwide in scores of customers' airplanes. Those airplanes might still be flying with that software had one manager not stood his ground, an act requiring intellectual autonomy and courage, and

followed up on an intuition, “Now, that’s odd.” The near-miss was scary enough; the team had seized the easy answer and nearly deprived themselves of the chance to discover a latent software flaw in the airplanes flown by their customers worldwide. Fortunately, the incident was a flag one manager chose not to ignore.

Recall the *Deepwater Horizon/Macondo* oil spill of 2010 that released almost five million barrels of oil into the Gulf of Mexico, killed eleven oilmen, and devastated the Gulf of Mexico. The well blow-out, explosion, and subsequent environmental disaster were directly attributed to leakage of oil and natural gas through cement seals at the bottom of the well, 18,360 ft. below sea level, 13,000 ft. below the sea-bed (Graham et al., 2011). At the time of the blow-out and explosion, drilling was complete, and the well was being capped for later use. The presidential commission cited nine distinct decisions on the part of the drilling companies that significantly raised the risk of seal failure and blow-out, and that resulted in all the grievous implications we watched on TV (Graham, p. 125). The precise cause of the failure remains unknown, the evidence buried under a mile of seawater and another two miles of rock.

Seven of those nine decisions were made by engineers ashore, under financial and schedule pressures that typify every engineering activity. The commission despaired that the engineers ashore never systematically considered the elevated risk of those seven decisions’ *cumulative erosion* of their safety margins. Each decision appeared to have been taken in isolation as a reasonable cost and schedule-saving measure; but, taken together, they significantly undermined the well’s integrity. More importantly, the erosion in overall safety margin was not communicated to those aboard the rig. Nor had lessons and observations been forwarded from an “eerily similar” close call four months earlier in the North Sea (Graham, p. 124). Such warnings

might have adjusted the later drilling crew’s interpretation of what they observed, fostered heightened caution, and reframed the mental models that propelled them up a tragic ladder of inference.

Those aboard the rig had the opportunity to arrest the blow-out, as had happened in the North Sea episode, but they ran afoul of confirmation bias, derailing accurate interpretations of what they saw. The morning of the tragedy, tests of the well seal’s integrity had been cancelled because the cementing process had gone smoothly, with expected surface observations. The immediate interpretation was that, if the surface indications were good, then the seals 3-1/2 miles below were good, and the test crew was sent ashore to save the test’s considerable expense. Emails danced between the rig and shore proclaiming “Went well!” and “Great job!”

Next, an over-pressure test at mid-day went smoothly, demonstrating no leakage out of the well column into the porous oil-laden rock. This reinforced confidence in their conclusion that the cement seals were in good shape, so yet another feedback path shaped the data-filtering rung of the ladder of inference.

The eighth decision exemplifies the hazard posed by the ladder of inference; here the participants were blind to what we can, retrospectively, regard as their irrationality. The final test, depressurizing the well column, failed all three times it was repeated, and this should have suggested a gas/oil leak through the seal and into the well column. In the test, the pressure was bled to zero, the top was sealed, and then the pressure rebounded to almost 1500 psi as if the well was being pressurized from below. This thrice-failed test was dismissed *because it contradicted their previously established convictions* that all was good. An alternative test was devised which the well appeared to pass, and all the while the primary instrumentation continued to indicate a

leak allowing oil to press into the well. Drillers interpreted the indication as due to a sensor failure, and thus justified their dismissal of the failed results. But, tragically, if the readings were correct, they signaled a risk of blow-out.

After the “passed” leak test, the well was re-opened to pump out drilling mud before pouring a second cement seal. The ninth and fatal decision was failing to monitor ancillary indications that would have clearly indicated whether the seal was holding. But the successful alternative test had been accepted at face value. The accident report points to as many as four data indications of an unfolding blow-out, starting almost 30 minutes before the point at which the blow-out might have been averted (Graham, pp. 109ff). We can’t know what the drillers were watching or thinking; they were the first to perish. It is likely that a bubble of natural gas expanded rapidly as it rose through the well, accelerating everything above it as it rose. Once past the valve on the seabed floor, a massive explosion was certain once the gas bubble “kick” hit air, though quick action might still have arrested the months-long spill that followed.

So, as with the *Challenger* and *Columbia* accidents, data waved red flags that were explained away by inferences consistent with what engineers and operators expected to see. You and I would be culpable of the tenth puzzling decision in the *Deepwater* case if we were to deride the participants, believing we’re immune or wiser. These were rational, experienced technologists. Too many studies show that, if you just change the people without changing the culture/system, then you still get the same outcome (Senge, 2006). You and I would likely have made the same judgment errors in the presence of reinforcing loops that convince us to dismiss anomalous results. To get a different outcome, we must change the thinking patterns and reinforcing loops.

Not only are we not immune to the

rush to judgment in our *technical* judgments, with implications for our customers and communities, but we are even more prone to rush to judgment in our dealings with others. The implications may not be as grave as killing eleven and polluting miles of beaches, but the behavior remains insidious and destructive.

We often rush to judgment when we ascribe motive to a colleague. “He must be doing this because. . . .” We’ve committed the narrative fallacy in concocting a back-story that explains what we see (Kahneman, 2011). Meanwhile we’ve ignored or dismissed alternative explanations and falsely presumed that “what we see is all there is.” We can’t know someone’s motive unless they tell us. Moreover, we know the narrative fallacy stubbornly resists new data. It uses a feedback path whereby new information is filtered so as to reinforce existing conclusions.

I lament having done this to a peer a number of years ago. Our organization was struggling to define our strategy, and relationships were strained. While I was gone on an extended leave, a peer announced a framework for working a task he’d been assigned. In my view, his framework renounced several years of work, and I concluded his motive had been to jettison that work while I was away. I learned of this on vacation, and I flamed him publicly by email, uncharitably and unnecessarily. My attack was fueled by my unwarranted presumption, but I later understood he was simply trying to make progress on his task and didn’t understand what work had already been accomplished. Repairing the breach I aggravated has taken several years.

We rush to judgment when we ascribe opinions to others, based on some one thing we know about them. “You’re retired military; you must support aggressive military intervention and adventurism.” “You voted for xxx last election; you must believe” “All you (social affiliation) think . . .

.” We allow ourselves complex opinions on matters of import to us, yet presume that those around us are simplistic and that they think monolithically with the group to which we’ve assigned them.

Such thinking behaviors harm both our own thinking and our relationships with others. For our part, our conclusions are often inaccurate, foreordained not by the data but by our unwitting assumptions. We will always filter data. The hazard is in not recognizing why we labeled some as relevant and significant and why we disregarded others. Our conclusions may appear plainly illogical to others, but they appear sensible to ourselves because we have unspoken assumptions operating within our internal unspoken argument.

As with my personal story above, the rush to judgment can severely erode team trust. Many will interpret the acts of others in the most unfavorable light, assigning motives at odds with our own. We presume they are acting out of self-interest or the interest of their division (or faction), rather than the interest of the whole. The gloomiest of us may presume our teammates intend our harm or failure.

Paul and Elder’s model suggests several antidotes to this behavior. The Intellectual Elements, Standards, and Virtues particularly remind us to ask questions that expand our breadth, our depth, and systems interactions. First, recall the value of contrary, contradicting data and recall Francis Bacon’s admonition to treat our favorite ideas with suspicion. If we’re committed to accurate learning and reasoning, we’ll habitually ask ourselves, “What evidence would prove us wrong?” This question also reflects intellectual integrity, humility, courage, and curiosity. In the *Columbia, Challenger*, and *Deepwater Horizon* situations, “prove it’s unsafe” culturally displaced the expectations that engineers would need to “prove it’s safe.” Second, we must be mindful of the assumptions that color both the data we see,

and the inferences we draw. “What are we assuming?” is always a helpful question. Similarly, “What data have we overlooked?” In the rush to answer a question, we can slow our ascent up the inference ladder by asking, “What alternative explanations can we imagine?” This question has been a staple of every accident board on which I have worked. Even when the evidence points strongly to a particular cause, investigators build their case by systematically rebutting all imaginable alternatives.

Where other people are the subject of our hasty inferences, our thinking lacks virtue as well as excellence. Fairmindedness calls for charitable thinking, believing first that others’ motives are upright and their decisions rational from within their point of view. Empathy and humility both call for questions, not inferences, empathy because I should really want to understand others’ perspectives, humility because I am mindful of the possibility that I am the one in the wrong. Curiosity compels us not to feel settled with the answers we get, but always to be seeking to refine or rebut them. Autonomy calls us to resist being swept along by the theory of the day. It seems we are back to “Humble Inquiry.”

Hence, as my teaching and study have shifted from purely technological towards more leadership and team behavior, I have found Paul and Elder’s approach more valuable as an explicit tool for describing and addressing the thinking behavior that characterizes teams that excel and those that struggle. I can also add that I have learned through conversations with colleagues that other Navy organizations have come to the same conclusion and have imbedded Paul and Elder’s approach in their practices.

Summary

I've gained valuable insight into leading technical teams through all the authors I've cited above, and grown as a consequence both as a leader and educator. Paul and Elder's influence has been foundational; their construct of critical thinking provides the framework through which I process, assimilate and more rapidly apply others' insights. And I have never seen a domain where their framework did not apply.

This embodies what I believe Richard Paul meant when I so frequently heard him exhort, "Focus on ideas that integrate." For me, his are the ideas that integrate all else that I learn. To my mind, the business and organizational insights of Goleman, Senge, Schein, Collins, Agyris, Sinek, Drucker, Catmull, Syed, and others do not stand independently, nor do they stand in contention (e.g. "Collins says humility is most important, but Goleman indicates it is empathy. They can't both be right.") Instead, they actually reinforce one another and deepen my understanding of each. Goleman and Collins mutually exhort me to grow in intellectual virtue, a concept that Paul and Elder helped me better understand. Marquardt and Collins have each challenged me to inquire more and advocate less; Paul and Elder have taught me the questions with which to open my every inquiry. Senge, Catmull, and Syed have called me to place learning at the center of my organization's culture; Paul and Elder taught me the locus of learning is the question.

This week I read another appeal from my corporate leadership to better foster critical thinking skills among those we lead. I'm not sure that such corporate appeals express anything more than a vague idea of what they seek. In contrast, the Paul-Elder approach has provided my agency—one within that corporate structure—with a *substantive understanding* of what we mean by critical

thinking and how we might develop it in our people.

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Richard Paul and the Philosophical Foundations of Critical Thinking

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Abstract

The late Richard Paul was arguably the most well-known and influential person in the history of the critical thinking movement. This reflection on and tribute to his work focuses on Paul's genius in applying his knowledge of important works in the history of philosophy to the development of a robust conception of critical thinking, one that has wide appeal, not only to philosophers, but to faculties across academe. I also discuss the debt so many of us who teach critical thinking owe to his amazing scholarly and organizational skills, e.g., the 36 years of the Conference on Critical Thinking and Educational Reform, his in-service work for hundreds of faculties, his distribution of over one million "Thinkers Guides," and his successful efforts to make critical thinking the core concept in education.

Keywords: critical thinking, critical thinking across the curriculum, critical thinking and the history of philosophy, Deductive Reconstruction, Foundation for Critical Thinking, Richard Paul, weak-sense critical thinking, strong-sense critical thinking.

I. Introduction

Writing about Richard Paul's contributions to what is called "The Critical Thinking Movement" is both an honor and a challenge. It is an honor because, I would argue, no other person involved in the movement has had a greater influence on so many people and in so many areas central to critical thinking than Richard Paul. It is a challenge because there is no way in a short paper to do justice to even part of Paul's influence and contributions.

Michael Scriven has correctly described Richard as "one of the most influential *evangelists* of the Critical Thinking Movement" (Paul, 2011, p. 22). As all good evangelists, Richard inspired many of us, perhaps thousands, to devote a good portion of our academic lives to thinking critically about critical thinking: What exactly is it? What necessary conditions separate it from other kinds of thinking? How can we best teach it? And how can one honestly assess whether students have learned it in any significant

way? In my own case, Richard Paul was the inspiration for much of what I, as a philosophy professor, tried to accomplish in my thirty-seven years at Baker University. So, it is a great honor to be asked to reflect on at least some of his work. Part of what follows is a description of how I began my narrative with Richard Paul and critical thinking, followed by a short discussion of what I take to be one of Paul's most important contributions to the field of critical thinking and, finally, a discussion of a couple of areas where we once disagreed but where I have since changed my mind.

II. History

In 1983, I had just completed my dissertation titled *The Philosophical Foundations of Simone de Beauvoir's The Second Sex*. What impressed me most in reading de Beauvoir's famous book was how she, as a person educated in the history of philosophy, was able to apply her knowledge of the major philosophers to the question of why women as a class were and remain second-class persons. I could see that she

had obviously done her homework, drawing heavily on the ideas of Aristotle, Hegel, Marx, Husserl, and, of course, Sartre to address the question. From my perspective, as a PhD student in philosophy, grounding *The Second Sex* in the philosophical traditions gave her analysis and feminist perspective a great deal more credibility than they would otherwise have had. In the hands of de Beauvoir, philosophy became a powerful tool that enabled her to make a huge difference in the lives of millions of women.

At the same time that I was working on my dissertation, a senior seminar required of all graduates of Baker University was in crisis. The seminar required seniors to choose a public policy issue brought about by current developments in science or technology, research the issue, evaluate alternative policies, and choose the most reasonable one. They then wrote, presented, and defended a fifteen- to twenty-five-page position paper arguing for the chosen policy. It was clear to most who were teaching the course that many of our seniors were not prepared to write such a paper. The main problem was students had little experience in making and evaluating arguments. (Of course, with no required course in logic or critical thinking, we should not have been surprised.)

At the same time, our Academic Dean had received a brochure from Richard Paul advertising the International Conference in Critical Thinking and Educational Reform at Sonoma State University. He thought the description of critical thinking sounded like a promising cure for the problems our seniors faced. So, with the help of a grant from the National Endowment of the Humanities, he sent me to the conference to find an articulate expert and arrange for the person to come to Baker the following summer and give a week-long workshop to our faculty on critical thinking and ways to integrate it into all of our courses. So, I signed up for the conference and went to Sonoma State. Little did I know that

my academic life would be forever changed.

The conference started on a Sunday morning. Richard Paul stood in the open air on a raised podium with a microphone and spoke to over one thousand attendees mostly seated in chairs on the lawn of Sonoma State University. His topic was how education should be reformed with a focus on critical thinking, rather than its typical emphasis on memorization and regurgitation. Paul also warned the audience that students' beliefs were mostly a function of culture rather than honest inquiry and rational choice. He explained how natural human biases interfered with clear thinking, and how education tended to be aimed more at indoctrination than creating reasonable citizens capable of thinking critically about important issues in their lives and the life of the state.

What immediately struck me was how, much like Simone de Beauvoir in *The Second Sex*, here was a very articulate person, educated in philosophy, who was using his knowledge of the history of philosophy to effectively communicate important ideas about the human condition and education to a general audience from many different disciplines. The phrase was "critical thinking," but the message could just as easily have been, "Socrates warns in *The Allegory of the Cave* that, unless we learn to think beyond our culture, we are slaves to its unquestioned ideas and values." Or Paul could have said, "We need to remember that Francis Bacon warned us in *The Four Idols* that we are all innately disposed to specific irrational tendencies—tendencies to only look for evidence to support our beliefs and ignore counter-examples, tendencies to see patterns and causal connections where there are none, tendencies to trust our sense experience over data, the tendency to understand all events through the lenses of some pre-existing general theory. We need to be aware of these tendencies and learn to fight against them." Richard Paul used the notion of "critical thinking" as a way to approach questions and

issues that were pretty much an extension of what some of the major figures in the history of philosophy had modeled, e.g., Socrates, Aristotle, Aquinas, Bacon, and Mill. (Later, in looking at material on the “History of Critical Thinking” on his Center for Critical Thinking website, Richard spoke directly to how critical thinking is imbedded in the philosophical tradition.) To me, who had been taught to give great respect to these thinkers and their writings (Hatcher, 2013), this gave critical thinking a legitimacy and status far superior to fads in education that were so often touted as cure-alls by the academic equivalent of “carnival barkers.” In other words, as Paul presented it, critical thinking legitimized the value of philosophical thinking to the wider circles of academe from kindergarten to graduate education.

While the emphasis on reflective thinking and rationality is nothing new to philosophy teachers, we were a small circle. To share these philosophical values with thousands of teachers from all disciplines, who were looking for ways to improve their teaching, was pure genius and did a great service to all disciplines. I think Francis Bacon captures beautifully the distinction between what Richard Paul did with the history of philosophy and what the rest of us tend to do. In the *Novum Organum* (#95), Bacon draws the distinction between scholars and scientists who are like ants and those who are like bees. Ants, like most scholars, work incessantly, finding food and bringing it back unchanged to share with the colony. Bees, on the other hand, transform what they find (pollen) into something very special (honey). Richard took much from the history of philosophy and transformed it into material that attracted and served the needs of thousands. It was pure genius, I thought. The very idea that knowledge of the history of philosophy could be put to such good use was exhilarating. It changed my life.

To use an example from my own

experience, two years after the initial conference, I was able to convince my Academic Dean and faculty colleagues to support the efforts of a group of us to design a two-semester sequence in critical thinking and written composition to be required of all freshmen (2013). These non-philosophers would never have been interested in requiring all students to read the works of philosophers like Plato, Aristotle, Aquinas, Bacon, or Mill—the philosophical foundations of critical thinking. But critical thinking, as Richard Paul had presented it, could be presented so it appealed to almost everyone in academe. To be against critical thinking would be akin to opposing something like “teaching children the ABCs.” We traditional philosophers, who had been arguing for much the same things for centuries, could never have convinced our colleagues of such a shift in education. Hence, those of us who have been able to teach critical thinking for over 30 years, owe a great deal to Richard Paul, “*the evangelist*.” He was instrumental in convincing thousands that critical thinking was an absolutely essential element in education. I should point out that George Hanford and the College Board were also instrumental in raising the interest in teaching logic and reasoning skills across education when they published *Academic Preparation for College: What Students Need to Know and Be Able to Do* (1981). Hanford and others argued that education needed to include what they called “the Fourth R” or Reasoning, beyond the traditional three R’s. And, of course, a good deal of critical thinking is about good reasoning. I believe copies of this book were sent to every school in the US. Hanford was the keynote speaker at one of the earliest critical thinking conferences at Sonoma.

Beyond Richard’s ability to use his knowledge of philosophy to convince so many that education should focus on critical thinking, as most who knew him were aware, Richard Paul had great talents in other areas.

I cannot think of another thinker who has been so adept in transforming his ideas about educational reform into a reality. Being skilled in writing books and papers is one thing, but being able to organize large and complex events is quite another. For example, that annual conference at Sonoma State, begun in 1980 and attracting thousands of scholars and teachers from disciplines across academe, is still running 36 years later. To me, the organization of this huge and complex event is amazing. I could not imagine the amount of work that such an undertaking required.

To get some appreciation for the complexity of these four-day conferences, the program for the 1995 conference was over 190 pages long. Richard's amazing energy and organizational skills were clearly on display throughout the four days. For example, in 1995, while overseeing the complex workings of the conference, he also gave eight presentations, including the traditional opening hour-long welcome speech on the first Sunday of the conference. (Some of us came to think of these Sunday morning speeches, in the open air of Sonoma State University, as sermons in "The Church of Reason.") Putting on this conference alone would place Richard Paul in the annals of critical thinking.

As the chief architect of the International Conference on Critical Thinking and Educational Reform, Richard brought together some of the most important scholars and writers in critical thinking: Bob Ennis, Ralph Johnson, Matthew Lipman, John Hoaglund, Neil Brown, Stuart Keeley, Stephen Norris, Harvey Siegel, Michael Scriven, Tony Blair, Ed Damer, Alec Fisher, Bill Dorman, Vincent Ruggiero, Sharon Bailin, Mark Battersby, Maurice Finochiarro, Mark Weinstein, Ian Wright, Gerald Nosich, Connie Missimer, Zachary Seech, Perry Weddle, Jerry Cederblom, and John Chaffee, to name only a few. (Some of the works from these scholars are listed as "Recommended Readings" at the end of the 1990 edition of *Critical Thinking*:

How to Prepare Students for a Rapidly Changing World, as well as in the works cited page of this paper.). To get a sense of the quality of the papers, many of the presentations by these scholars later became published papers. The conference gave these cutting-edge scholars the opportunity to try out their ideas and receive immediate feedback from other leading scholars in the critical thinking field. Dialectical thinking was alive and well at the Sonoma Conferences.

It also gave newcomers, like me, an introduction to numerous debates over critical thinking. That was an important and exciting part of the Critical Thinking Movement; that is, it was obvious that there were still many important issues that needed to be addressed. I often thought of the conferences as a crucible where, through heated debates, important ideas became more and more purified. The ideas of these leading academics also inspired some of us to study many of their works. For example, it was only after hearing a presentation by Harvey Siegel on what is wrong with epistemological relativism that I was inspired to read *Educating Reason* and then use his book as a springboard for the staff's development of our critical thinking and written composition program we were planning at Baker University. It was only after hearing a presentation by Gerald Nosich that I read his then-new text, *Reasons and Arguments*. (Much to his amazement, the idea of Deductive Reconstruction has, for better or worse, stuck with me as a very teachable model for critical thinking for over thirty years (Hatcher, 1999, 2013b)).

So, looking back, one might legitimately ask, where would the widespread interest in critical thinking be today if it had not been for the tireless efforts of Richard Paul? If one agrees with Jean-Paul Sartre that humans are only what we do, then, by any measure, Richard Paul was a remarkable human being: a committed visionary who was a very skilled, very focused, and very energetic

man. "Raise high the roof beam, carpenters."

In conjunction with the conferences, Paul created the Center for Critical Thinking and Moral Critique, also located at Sonoma State University. His combining critical thinking and moral criticism was yet another stroke of genius. This is because, if the focus of critical thinking is only on issues surrounding epistemology or what counts as a justified belief, its appeal would be limited to only those who were interested in those issues. But once critical thinking was linked to ethics and moral criticism, the duty to think critically applied to all rational beings. For example, practical arguments about the effects of global warming on coastal cities tend only to interest people who would be affected by the rising sea levels. However, to put forth a moral argument about our duty to carefully evaluate the consequences of our behavior on others, as well as future generations, or the consequences of endorsing practices that harm those who live on the coasts, and that do not pass any utilitarian or contractarian test, is to argue that all people have specific obligations to others. In the spirit of W.K. Clifford, there is something immoral about ignoring counter-evidence against one's half-baked theories or ideas. This is connected with Paul's emphasis on intellectual dispositions such as confidence in reason.

Richard Paul also created the Foundation for Critical Thinking, originally in Santa Rosa, CA. Its website, www.criticalthinking.org, is a goldmine for materials on every aspect of critical thinking. According to Paul's "Reflection Piece" in *INQUIRY* (2011), he and the folks at the Foundation for Critical Thinking wrote and distributed over 1 million complimentary "Thinker's Guides" on critical thinking suitable for use in classes across academe. He set up Critical Thinking Academies in England. He did hundreds of in-service faculty workshops in the US (including one in 1987 at Baker University) helping students and faculty understand the importance

of integrating critical thinking into their classes. Paul also authored numerous scholarly articles on critical thinking: its definition, how to teach it, and how to assess it. There is a richness and fecundity found in these articles that is quite rare in scholarly philosophical writings. (For only one example, see his 1989 article "Critical Thinking in North America: A New Theory of Knowledge, Learning and Literacy," *Argumentation*, 3, 197-235.)

III. One of Many Major Ideas

Of all the important ideas that Richard Paul contributed to the Critical Thinking Movement, for the purposes of this short paper, I want to focus on only one element of his theoretical and pedagogical writings: intellectual virtues or the moral dimension of critical thinking. There are many conceptions of critical thinking. Matt Lipman lists thirty-one in his 2003 book, *Thinking in Education* (pp. 56-58). However, one of the many important elements of Paul's thought was his continued focus on distinguishing honest, legitimate conceptions of critical thinking from bogus ones or pseudo-attempts. He called many dishonest attempts, particularly those by modern-day sophists, instances of "weak-sense critical thinking" (1990). Like a modern-day Socrates, Paul's moral critique (Paul, Elder, Bartell) was exposing those who were attempting to teach or even sell bogus critical thinking courses. In hearing many of Paul's presentations about this at the Sonoma conferences, I was always reminded of J. D. Salinger's character, Holden Caulfield in *The Catcher in the Rye*, who had a terrific eye for and dislike of the phonies in his life. Of course, as one might expect, given Paul's ties to the history of philosophy, this exposé of the phonies puts himself in line with a great tradition. It was exactly what Socrates was doing with the sophists and other pretentious folks who claimed to have a clear understanding of some important concept like knowledge, justice, friendship, piety, or love in many of the Platonic dialogues, but, upon

Socratic examination, did not. With respect to folks having a clear understanding of critical thinking, this problem is as prevalent today as ever. All too often, almost everyone in every discipline thinks he or she is an expert when it comes to teaching critical thinking. And, of course, as Paul, Elder, and Bartell have shown, this is absurd (1995). In their research project, when people who claimed to be teaching critical thinking were asked to define it, they could not do so in any meaningful way (1995). As Kevin Possin recently puts it, today “*critical thinking* has been defined . . . so absurdly broadly that any thought or any thought about a thought (i.e., metacognition) constitutes critical thinking. With this view comes the complete lack of recognition of expertise in critical thinking, since, as with all subjective matters, all opinions are equal—e.g., there is no expert on whether or not strawberries taste good” (Possin, 2016).

The phonies aside, the other ethical element that plays such an important role in Paul’s conception of critical thinking is what he calls “weak-sense critical thinking” (1990). To put it succinctly, legitimate critical thinking is honest, open-minded, unbiased inquiry. Like the sophists of the Platonic dialogues, someone who practices “weak-sense critical thinking” may possess the skills needed for legitimate critical thinking, but uses the skills only to support some preconceived favored ideas or agenda. When it comes to treating objections, only the simplest are addressed, ignoring all that may legitimately challenge the reasonableness of the position or belief. In all of Paul’s writings on the subject, developing intellectual virtues, especially “fairmindedness,” is central to becoming a legitimate critical thinker, as opposed to a phony.

One thing that Paul’s conception of “strong-sense critical thinking” implies is that, for most complex issues, there are indeed strong arguments on both sides. If taken seriously, this realization should incline critical

thinkers to be more tolerant of those who hold views counter to their own—at least until the strongest counter-arguments have been clarified and evaluated. Strong-sense critical thinking also entails that there is a genuine respect for others and their beliefs.

Another implication of this view is that the “strong-sense critical thinker” is one who takes counter arguments seriously and hence should be willing to change his or her mind if there is no reasonable response to the counter-arguments. On the other hand, the “weak-sense critical thinker,” one who never takes the strongest counter-arguments seriously, seldom, if ever, changes his or her position. This would be akin to what Popper called “the dogmatic thinker,” one who is primarily looking for evidence to support his or her position (bias) rather than taking seriously the evidence that might be used against the belief (1963). This distinction is of the utmost importance in Paul’s conception of critical thinking.

IV. Disagreements

Finally, I would not be doing my duty as a critical thinker, as Richard Paul defined it, if I did not at least mention some of our disagreements over the years. As Harvey Siegel so nicely put it, “Critical thinkers must be critical about critical thinking” (1997, p. 73). One area of disagreement that came up in the middle 80s was my concern that Richard’s emphasis on conceptual schemes implied a relativist epistemology. For example, in a 1985 paper in *Informal Logic*, he claimed that “First of all, the world is not given to us sliced up into logical categories, and there is not one, but an indefinitely large number of ways in which we may ‘divide’ it . . . and [there is] no ‘detached’ point of view from the supreme perspective of which we can decide on the appropriate taxonomy . . . Conceptual schemes create logical domains, and it is human thought, not nature, that creates them . . .” (1985, p. 40).

Being familiar with some of the critiques of tying reasonableness or truth to “conceptual schemes” (Davidson, 1974; Siegel, 1986; and Trigg, 1973), I argued, perhaps naively, that Paul’s reference to conceptual schemes would present practical problems for the critical thinking movement (Hatcher, 1987). For example, “How can one who believes that truth is relative to some particular conceptual scheme ever hope to evaluate competing beliefs which presumably reflect different conceptual frameworks” (p.4)? Also, if what counts for good reasons is relative to one’s conceptual scheme, then why isn’t critical thinking itself just one conceptual scheme among others? Why should it have epistemic priority over other schemes like witchcraft and voodoo? If one is committed to understanding all claims as relative to one’s chosen conceptual scheme, critical inquiry seems impossible.

Another area where I questioned Richard’s position was, in the tradition of Descartes, his emphasis on the individual thinker being able to best decide what was reasonable to believe and do. This focus on the individual thinking about his or her thinking is present in much of his writing. Consider his definition of critical thinking quoted by Fisher and Scriven: “Critical thinking is that mode of thinking – about any subject, content or problem – in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them” (p. 91). Richard gives a similar definition in a paper for *Argumentation*. Critical Thinking:

- (a) “The art of thinking about your thinking, while you’re thinking, so as to make your thinking more clear, precise, accurate, relevant, consistent, and fair.”
- (b) “The art of constructive skepticism.”

- (c) The art of identifying and removing bias, prejudice, and one-sidedness of thought.”
- (d) “The art of self-directed, in-depth, rational learning.”
- (e) “Thinking that rationally certifies what we know and makes clear wherein we are ignorant.” (1989, p. 213)

From these examples, one can easily see that Paul’s conception of critical thinking seems not only to emphasize metacognition or “thinking about your thinking,” but requires it (Fisher and Scriven, p. 91).

From personal experience, I questioned this focus simply because I had benefitted greatly from the criticism of my ideas and writings by my teachers, my colleagues, and especially journal editors. I (and others) saw critical thinking, and philosophy in general, as a dialectical enterprise, where the most important members of the dialogue were other inquirers. This is what Johnson called “the dialectical tier” (2000, p. 164), or Peirce referred to as a “community of inquirers” (960, p. 268). In my experience, I knew that I, who claimed to be a “fallibilist,” was my own worst enemy with respect to my own thinking and needed the help of others to clarify, critique, and reformulate my ideas. So, I concluded, it was a mistake to define critical thinking as primarily *individuals* thinking about their own thinking in an attempt to improve it. As J. S. Mill pointed out in *On Liberty*, the essential element for inquiry is an openness to the criticism from others. “He who knows only his own side of the case, knows very little of that” (1978, p. 35).

In retrospect, I think both of my criticisms, e.g., Richard’s reference to conceptual schemes and his focus on critical thinking as the individual thinking about his or her thinking, were not wholly correct. In 1987, on his visit to Baker University,

he gave me a draft of a paper co-authored with Joel Rudinow, “Bias, Relativism, and Critical Thinking.” After explaining that all of us live in “meaning-schemes, with conceptual, conative, affective, and behavioral dimensions” and how “We cannot step outside of our experience to look at it from some trans-ideational or completely detached standpoint” (pp. 15-16), the paper ends by saying the best way to critically evaluate our personal thinking and our conceptual scheme is “from discourse and exchange with other minds; this indeed is the primary means whereby we can correct and balance our thinking” (p. 16).

This claim clearly contradicts the idea that operating from conceptual schemes leads to the inability to evaluate claims from different conceptual schemes. It also undermines any Cartesian idea of a critical thinker as an individual who can best improve his or her thinking by simply monitoring their biases or “thinking about our thinking.” In that paper, Paul and Rudinow are claiming that it is possible to evaluate competing conceptual schemes and that the best way to do that is through the criticisms others might provide. I only wish Paul and Rudinow had gone on to recommend a healthy dose of pragmatism as a way to evaluate competing conceptual schemes and the ideas coming from different schemes. That is, one might evaluate competing conceptual schemes by comparing the results or outcomes relative to our stated purposes.

Another place where I disagreed with Richard was what he understood as the consequences of being committed to infusing critical thinking instruction across the entire curriculum K-12, in all subjects, and in college. To do this, he developed theories and pedagogy that could be applied to this wide audience. To this end, he and his colleagues at the Critical Thinking Community developed an amazing amount of teaching materials that gave schematic instructions and representations of the various dimensions of critical thinking. These originally included nine Elements of

Reasoning, fourteen Standards of Thought, thirteen Traits of Mind, seven Modes of Reasoning, and twenty-one Abilities (1992). These, he thought were all part of what it meant to engage in critical thinking and for students to become critical thinkers. (Much of this sort of material is also included in his 2011 and 2012 reflection pieces for *INQUIRY*.)

While one cannot help but admire the complexity, depth, and breadth of this work, it did not appeal to me. First, it seemed to move critical thinking away from the Socratic position that Paul said was the source of critical thinking (1987). It seemed to me that Socratic inquiry, as presented in the Platonic dialogues, was much simpler than this. For example, one can analyze Plato’s *Meno* using straightforward deductive reconstruction (Hatcher, 1996). This is true for numerous other dialogues. In fact, it was symbolizing many of Socrates’ arguments in my Plato seminar in graduate school that inclined me to focus on deductive reconstruction (2013b).

In the spirit of Ockham, I had become a fan of simplicity, where possible. For my own materials in my work with faculty members teaching in the Baker University Critical Thinking and Composition Program, by necessity, the motto was “Keep it simple, stupid.” Consider, for example, Gerald Nosich’s prescription for argument evaluation in his *Reasons and Arguments* (1982). According to Nosich, we should evaluate the reasons for a position by treating the conclusion and reasons as an enthymeme, and then add the major premise to turn the argument into a valid deductive argument, i.e. we apply the technique of Deductive Reconstruction. (Please note that, because of Richard Paul’s influence, Nosich has long since abandoned this strategy (2010; 2012) in an attempt to be more inclusive of disciplines beyond philosophy.)

The method of Deductive Reconstruction is summarized by Nosich as

follows:

Step 1. Paraphrase the argument so that you are sure you understand it.

Step 2. Break the argument down into premises and conclusion.

Step 3. Arrange the premises and conclusion in their logical order.

Step 4. Fill in the missing premises needed to make the argument valid.

Step 5. Criticize the argument for validity and the premises for truth. (Nosich, 1982, p. 142)

For me, the very simplicity of this approach had great appeal: clarify the argument, make it deductively valid, and then evaluate the reasonableness of the premises. Unfortunately, according to the assessment data from standardized critical thinking tests used in the BU program, some faculty members had difficulty understanding even this simple approach and could not teach it (Hatcher, 2013b). Some of the students even got worse on the post-tests.

The Deductive Reconstruction approach did not appeal to Richard. It did not serve his purposes of creating a robust critical thinking program for teachers from kindergarten to college graduation.

My last conversation with Richard was in the spring of 1999. In August of the previous year, by Richard's request, Jerry Cederblom, Ralph Johnson, and I had worked hard putting together what we thought was a well-integrated four-day workshop on critical thinking and informal logic for Richard's 18th Annual International Critical Thinking Conference. The four-day workshop needed to coordinate and integrate a narrative covering what Ralph called "the whole enchilada." The preparation was demanding. And, of course, we thought the workshop was a great success. The next year, we did not receive a request to

repeat the workshop as part of the 19th annual conference. I remember calling Richard to see if perhaps our services had been overlooked by mistake. His response was absolutely clear. He pointed out, much as Gerald Nosich did in his 2011 "reflection piece" for *INQUIRY*, that what Jerry, Ralph, and I did last year was "critical thinking for philosophers," not critical thinking for disciplines across the curriculum. Because by far the majority of the attendees at Richard's conference were not trained in philosophy, our approach was not suitable. We needed to change if we were to continue to be part of the conference.

Of course, as I found out later, Richard was correct. People who have no training in logic have a lot of trouble understanding what, to philosophers, is pretty simple. Such standard logical concepts as *deductive validity* and *soundness* are foreign to their way of thinking. As a result, even though I continue to have success in my college critical thinking classes, I have given up expecting most non-philosophers to successfully employ the Deductive Reconstruction model that I use (2013a).

V. Conclusion

I think that many of us "old timers" of the critical thinking movement would agree when I say that no one did more than Richard Paul to make enhancing critical thinking skills and dispositions a central goal in education. Who would have thought in 1980, the year of the first Sonoma conference, that 30 years later, an article in *Forbes* would list critical thinking as the skill most desired by employers (Casserly). No one else has left such an abundance of valuable materials to be used in the teaching of critical thinking. And only through Richard's efforts in organizing the annual conferences was a large community of inquirers, all of us concerned with enhancing students' critical thinking skills, formed. We may not agree on the means, but we do agree on the end and its importance for education.

We thank you, Richard Paul! Our debt to you is huge. We miss you greatly.

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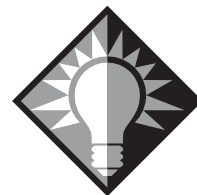
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Making a Campus-Wide Commitment to Critical Thinking: Insights and Promising Practices Utilizing the Paul-Elder Approach at the University of Louisville

**by Patricia Payette, Ph.D., University of Louisville
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Abstract

The purpose of this article is to provide an overview of the multi-year, critical thinking initiative at the University of Louisville called Ideas to Action, or i2a. This article discusses the rationale for the selection of the Paul-Elder critical thinking framework to guide the implementation and assessment of the project across curricular and co-curricular campus arenas. The co-authors used the research of Richard Paul to inform various facets of their project and worked with others on campus to create critical thinking learning communities, and to provide customized instructional consultations, in order to help faculty and staff choose and adopt methodologies that foster students' explicit development of critical thinking skills. The article discusses three examples of scholarship and innovative programs that resulted from professional staff members' integration of the critical thinking framework into their work with students..

Keywords: Richard Paul, critical thinking community, professional development

I. Beginning with a Quality Enhancement Plan

In 2005, the University of Louisville, embarked on a journey to develop its first multi-year initiative called a quality enhancement plan (QEP). The QEP is a required and was, at that time, a new part of accreditation for higher education institutions seeking the establishment or reaffirmation of accreditation through the Southern Association of Schools and Colleges—Commission on Colleges, or SACS-COC. The QEP must be proposed as a multi-year initiative with a focused plan to enhance and assess student learning in an area that the institution determines, after reviewing its own student-learning data and engaging campus constituents, will offer significant and lasting gains for its students.

In other words, the QEP requires every campus to commit to continuous improvement of student learning by identifying gaps in

student performance and creating a plan to address one or more of those gaps and then report on its efforts in a Fifth Year Impact Report. In 2005, in order to pinpoint the topic of our university's first QEP, our campus leaders launched a broad effort to engage students, faculty, and staff in voicing how best to improve the undergraduate experience at our institution. With analysis of this input from campus groups and with a close look at our undergraduate students' past performance on campus-wide assessment instruments, the need to address our students' critical thinking abilities became apparent. University leaders quickly took up this theme for the new initiative, citing the need to develop students who can survive and thrive in our rapidly changing world. Simply learning material to pass a series of tests and earn a degree is not the business of universities; we needed to shift the paradigm in thinking about how we engage our students in becoming problem solvers, professionals in all fields, and active

citizens in the 21st century. Our university put all of its QEP “eggs” into the critical thinking skill-building “basket.” This is not to say that critical thinking was not a priority in the intellectual development of our students prior to the QEP development. However, while many of our faculty implicitly modeled critical thinking in their instruction, they did so without explicit and systematic discussion of critical thinking skills. This did not allow students to clearly grasp that they were being asked to think in new ways, to practice those ways of thinking, and to receive feedback so that they could transfer those new ways of thinking to contexts across the curriculum and into their lives.

This focus on the need for students to become adept and practiced thinkers is not new to higher education. In 1994, Linda Elder and Richard Paul issued a clarion call to educators for a renewed focus on critical thinking--developing learners whose “minds are eminently adaptable and flexible, which are experienced in continually thinking and rethinking about issues and problems, and which do not resist questioning and overturning fundamental notions and practice.” These students are thus prepared to deal with the “three-fold force” in our world: “accelerating change, intensifying complexity, and increasing interdependence” (Elder & Paul, 1994, p. 34). As the new millennium began, many higher education institutions began to give more sustained attention to these broad but vital goals related to preparing students for success in our global, complex society. Critical thinking-focused projects began to spring up on campuses all over the country as educators recognized the need for creating learners who are “eminently adaptable and flexible” as more important than simply supporting students to successfully graduate with degree in hand.

In 2007, our institution submitted a QEP proposal for SACS-COC with two learning outcomes at its center: (1) students

will be able to think critically and (2) then be able to demonstrate integration of critical thinking skills with disciplinary knowledge in a culminating undergraduate experience, such as a thesis, service learning project, internship, or capstone experience. We named our QEP Ideas to Action, or i2a, to give a focus both on deepening students’ intellectual skills and then on guiding them to apply those skills in new ways. The authors of this paper were hired as part of the original i2a staff team to lead the project; Patricia is the executive director of i2a and Edna is the part-time i2a specialist in critical thinking, which allows her to maintain her teaching duties in the Department of Psychological and Brain Sciences.

While our i2a goals, strategies, and assessment activities were clarified and sharpened over the years as we operationalized our vision with campus colleagues, critical thinking as a central pillar of the project did not change. For the purposes of this paper, we will focus on sharing the lessons learned, the promising practices, and the insights that surfaced as part of our change process. We also provide a review of innovative projects that resulted from our multi-year effort to engage our campus colleagues in creating meaningful, lasting methods for incorporating a common critical thinking vocabulary into their work. These projects used the Paul-Elder approach in order to advance the goals for student learning and engagement. While many colleges and universities host similar projects designed to enhance their students’ critical thinking in academic programs, we are one of the few schools to extend this effort to the realm of student affairs, student services, and co-curricular programs. Additionally, while our central aim was to influence the quality of our students’ thinking, we, as faculty and staff members, found an invaluable benefit for ourselves in this work. As we absorbed and applied the practices and values of critical thought that we espoused for our students, our own decisions and strategies for fostering

lasting, critical thinking-inspired change on campus were solidified and deepened and our services and programs were greatly enhanced.

Shortly after the accrediting evaluation team signed off on our QEP proposal in 2007, we—along with the other members of the i2a staff team and our university-wide committee called the i2a Task Group—shifted our focus to the implementation phase of the project. We realized that our original plan to allow each school or college to adopt their own approach to critical thinking would not facilitate students' consistent intellectual development of common concepts across the undergraduate curriculum as we originally envisioned. We needed a common conception of what critical thinking actually entailed, a shared vocabulary that allowed for articulating and measuring learning goals and assessment methodologies across a wide array of disciplinary learning contexts.

II. Choosing A Critical Thinking Approach

We vetted over a dozen established critical thinking approaches in our attempt to isolate an appropriate, scholarly concept of critical thinking for our initiative. It quickly became clear that the Paul-Elder framework met all of our criteria because it is a *comprehensive* approach that can be applied across disciplines and it came with a wealth of online and print resources. We readily adopted the Paul-Elder framework because we recognized it as what Linda Elder calls a “substantive conception of critical thinking” (Elder, 2011, p. 2). The Paul-Elder framework allowed us to dismantle our own preconceptions about critical thinking and embrace a framework that could “target both the analysis and assessment of thought and take into account the affective as well as cognitive dimensions of thought. It emphasized not only intellectual skills and abilities but also intellectual traits” (Elder, 2011, p. 2). We found this inclusive, holistic

system helped us look beyond a narrow focus solely on cognitive skills of thinking. It offered our campus a rich conception of critical thinking that eschewed a theory of thinking that “merely offers a list of disconnected abilities applied in narrow ways” (Elder, 2011, p. 3). The framework's inclusion of *explicit standards* of critical thinking revised our initial thinking about how to assess critical thinking, and our faculty reported the framework's vocabulary was relevant to teaching and learning aims across our diverse schools and colleges. Later in the project, our professional staff colleagues who work with students in co-curricular, student affairs, and student services offices reinforced the appropriateness of our selection of the Paul-Elder framework by embracing its components for their own learning outcomes, thus emphasizing the universal nature of the framework.

The Paul-Elder framework involves three different sorts of components: the Elements of Reasoning (also known as the elements of thought), a set of Intellectual Standards, and an array of Intellectual Virtues. The Paul-Elder framework emerged from the original work of Richard Paul, beginning in the 1980's with his earliest writings (Paul, 1990). The Elements of Reasoning consist of purposes, questions, points of view, information, inferences, concepts, implications, and assumptions. The Intellectual Standards include clarity, accuracy, relevance, logicalness, breadth, depth, precision, significance, completeness, and fairness. The Intellectual Virtues are intellectual humility, intellectual autonomy, intellectual integrity, intellectual courage, intellectual perseverance, confidence in reasoning, intellectual empathy, and fairmindedness (Paul & Elder, 2014).

To learn about the Paul-Elder framework—its parts and its system as a whole—and how it can be leveraged for learning, our i2a staff team invested a great deal of time in both reading on our own and discussing as a group the books and guides

written by Richard Paul and Linda Elder, We realized early on that conveying the logic, the significance, and the relationships among the parts of the framework at an appropriate and meaningful level to our colleagues required sustained time, effort, and ongoing discussions that could not fit neatly into a one- or two-hour workshop. We needed to create a space for sustained scholarly discussions and explorations about the nature of critical thinking and about the implications of these discussions for teaching critical thinking in a wide array of disciplinary settings.

III. Faculty Learning Communities and the i2a Innovation Process

In late 2007, we reached out to a group of diverse faculty members and invited them to participate in a Faculty Learning Community (FLC) on Critical Thinking to “test drive” the Paul-Elder approach during the course of their teaching in the subsequent semester. This FLC was modeled upon the work of Milt Cox (2004) who proposed a mode of professional development to build community among colleagues and to advance innovative pedagogical practices by bringing together a small group of colleagues from across disciplines to engage in a series of facilitated discussions around the scholarship of teaching and learning, curriculum enhancements, and classroom practices.

Our FLC gatherings were led by us and the other members i2a staff, and they included group tutorials for the faculty to explore the underpinnings and central components of the Paul-Elder framework and to get support for redesigning key assignment and assessment tools to explicitly foster and measure critical thinking skills using the framework’s vocabulary. FLC expectations were that members would share their revised assignments with peers and learning community leaders to receive feedback, that they would read relevant scholarly articles prior to each session, and that they would

share along the way their key insights into this new way of teaching their own disciplinary content. Our learning community met every three weeks over the course of a single semester, supplemented by individual and small coaching sessions with members of our i2a team.

We based this strategy on the idea that the way to begin to “move the needle” on our campus-wide conversation around critical thinking—which for some faculty seemed redundant twith what they were already doing—was to first engage a small group of willing faculty members interested in improving their own teaching. These nine faculty members met the criteria for what Everett Rogers (1995) calls “venturesome innovators.” Rogers describes this category of individuals as the earliest group adopters of an innovation in any system or organization. They are well respected by others in the organization, they are willing to take risks in their work, they are resilient and persistent when their attempts at introducing an innovation includes a setback, and they serve as gatekeepers in introducing innovation approaches into an existing professional system. We found our own group of innovators by personally inviting to the pilot FLC individuals who were well-regarded instructors on our campus, regardless of rank or years of teaching experience or discipline. We reassured them that their own teaching practices and goals would serve as a central focus of the learning community and promised them they would be receiving guidance, structure, and support to integrate the Paul-Elder framework into existing courses goals and activities. We helped these innovators pave the way for other colleagues to participate in the project by asking our pilot faculty to share, at the end of the trial semester, the “before” and “after” versions of their critical thinking-infused assignments, to provide testimonials about the efficacy of the framework, and to co-lead workshops and

presentations with members of the i2a team.

The success of the initial learning community led us to offer similar learning communities for faculty each fall and spring semester from 2008 through 2010. Participating faculty reported that the learning communities were essential in supporting them as we modeled use of the framework tools, as we coached them through their course goals, and as we helped them choose and adopt methods for explicating fostering their students' critical thinking skills. (Cosgrove, 2013). We also offered customized instructional consultations to actively model the use of questions and concepts from the Paul-Elder framework to help our instructors think through their assignment and course design, to surface explicit expectations for students' learning, and to help them "map" their specific intellectual goals for learners using the framework's elements, standards and traits. These individual and small-group meetings that we conducted prior to and during the course of the semester to bolster the group FLC experience, prompted some profound "Aha" moments for us and our faculty colleagues about what critical thinking "looks like" in their discipline and in their course and about how to more clearly convey that thinking to their students. These meetings provided an opportunity for the "person-to-person," focused intellectual work that is necessary for internalizing the foundations of critical thought (Paul, 2007).

IV. The Reported Gains

The gains for our faculty reported as a result of the learning community experience—and the "wins" they shared as a result of their newfound engagement with students—were paralleled by our own insights into the nature of the QEP itself. Very quickly we began to see that our long-term project was transforming our own thinking. We came to see that i2a was less about having faculty add the magic words "critical thinking" to a syllabus and

"more about a new ways of thinking about student learning. Our faculty needed to rethink assumptions and adopt intentional and integrative practices -- to see their disciplines as modes of thinking, to help students make authentic connections to the world around them and to connect the dots, across courses, campuses and community" (University of Louisville, *QEP Impact Report*, 2013, p. 8). The only way to create the conditions that would give faculty the opportunity to do this reflective, intentional thinking and planning with us and their peers would be to provide a professional, safe "space and place" for this intellectual exploration.

V. Scaling Up the Effort

With this realization in mind and with the awareness that we couldn't manage to enroll hundreds of our faculty in the learning community approach, we needed to add a large-scale program to our training offerings. Accordingly, in 2009 we created a campus-wide conference on critical thinking. This multi-day conference, called the i2a Institute, provided an opportunity to invite all faculty in our University for full-day sessions on the Paul-Elder framework of critical thinking, and it created a venue in which they could learn from peers who had already begun to integrate explicit critical thinking concepts into their work with students. We offered a different iteration of the i2a Institute every May from 2008 through 2016, and we invited colleagues to attend from across the country who were engaged in similar initiatives with the same framework to share their strategies and results. Hallmark components of the i2a Institute included poster sessions and networking opportunities to facilitate peer sharing of critical thinking strategies and tools, small group workshops on various aspects of the framework, and plenary sessions and workshops that featured critical thinking scholars.

A cornerstone of the i2a Institute that

we hosted during the first six years were full-day workshops with Dr. Gerald Nosich from the Foundation for Critical Thinking. Dr. Nosich's sessions focused on sharing the fundamentals of critical thinking and the Paul-Elder framework, and, in a series of scaffolded sessions, through introducing the framework he effectively engaged participants in thinking about their own teaching and he employed related concepts and tools that the faculty could adapt and adopt in their own teaching contexts.

The strategies and sessions of the i2a Institute mirrored our strategies in the faculty learning communities and followed Richard Paul's recommendations for professional development programs that guide faculty in remodeling lessons for critical thinking. These recommendations include helping instructors to explore and solidify a coherent, unifying, complete concept of critical thinking, to generate strategies on how to operationalize that concept in their own teaching, to provide access to "before and after" lesson examples, and to gain practice in critiquing their own lesson and those of their peers (Paul, 1990). We embraced this emphasis on both theory and practice with peer engagement in every version of the Institute we held. As the years progressed many faculty members returned to the i2a Institute year after year, deepening their own thinking and practice in teaching for critical thinking. Some of these innovators and early adopters eventually began leading sessions and participating in panels at future Institutes where their enthusiasm, insights and classroom strategies served to illuminate the path for their peers.

Vi. Bringing Staff into the Critical Thinking Conversation

Our inaugural i2a Institute in 2009 was an appropriate opportunity to invite a wider spectrum of faculty and our professional staff colleagues into the critical thinking conversation. Although our original QEP plan

for SACS focused exclusively on goals related to student learning in academic programs, we came to see that this worthy, but narrow, focus would send a misguided message to our students. We were in danger of inadvertently promoting the idea that critical thinking is something our students did to perform in the classroom, but something they need not bother with in other parts of their lives. We did not want to fall into the trap that our students do when they perceive our academic course material as merely "school stuff." This is a category of ideas or information that is neatly compartmentalized in students' minds as relevant only for regurgitation on an exam, and, therefore, a category to be relegated to the classroom with no relevance to the outside world (Nosich, 2011). Since we frequently promoted the idea that the Paul-Elder critical thinking framework was applicable to thinking through problems in all parts of a learner's life, it was time to reach out to our professional staff colleagues who worked, mentored, and taught learners in other campus settings. Again, critical thinking was not to be viewed as simply another example of "school stuff" to be saved for thinking through problems or issues in the classroom—rather it was a vital, intentional set of intellectual moves that could be instructive in every part of a student's life.

As we did with our faculty colleagues, we invited an initial group of staff innovators to be part of a learning community for professional staff). We formatted this learning community as a two-year program designed for those who have oversight over programs in the areas of co-curricular departments, student services, and student affairs. From the beginning, we challenged the notion that critical thinking outcomes were simply an "add on" to what they were already doing with their students and departmental colleagues. Instead, we engaged them in a series of questions, prompts, and conversations to unearth the thinking and developmental goals they had for their undergraduate students. We did this

in order to identify the gaps and opportunities to enhance, emphasize, and strengthen what we called “the thinking they valued most for students.” In this way, the focus was on the thinking and growth their student clients needed to do, rather than the programs students need to attend. In the first semester of the staff learning community we helped participants solidify a scholarly concept of critical thinking, and we guided them to become familiar with the Paul-Elder framework and apply to their work. In the second semester, they selected an existing program or effort in their department in which to infuse critical thinking. Participants created a plan to pilot and assess that effort throughout the two semesters of the next academic year and to share their epiphanies, strategies, challenges, and triumphs along the way in our monthly meetings.

This learning community, like the prior faculty learning community, created a collegial, safe space for both new and seasoned professionals to be “learners with peers” and to have ready access to i2a team members and a wealth of resources to undergird their “trial and error” work with making critical thinking an explicit part of their everyday work. Ashley Finely explains that we can cultivate innovative ways of practice with colleagues on our campus and help professionals become learners by creating the conditions for “conversations, demystification and a low-stakes trial run” (Finely, 2016, p. 19). Finley has this advice for campus leaders who wish to promote new paradigms of teaching, learning and student success: “Faculty and staff need to pilot courses or programs in order to work out the kinks and to learn what they could not have known ahead of time.” She posits that securing buy-in for new initiatives or focused efforts on campus is not like selling a car; it’s about engaging faculty and staff in exploring practical ways to integrate new concepts into their academic and professional lives.

To support this alignment between their work and our approach, we began every

learning community cohort by asking faculty and staff to articulate the learning and thinking goals they have for their students in a specific context. Then we proceeded to guide them in “mapping” those goals to the language and concepts of the Paul-Elder framework. We aimed for commitment to fostering a new way of practice, not compliance with a university expectation. We were careful not to advertise i2a—or our learning communities-- as a quick fix to help the university “jump through hoops” with SACS-COC. Instead we stressed that it was a program to support a shared goal that we all had, regardless of where our office was located on campus, namely the goal of supporting students’ learning and their transformation as thinkers and whole human beings.

Although the learning community brought in an initial group of staff innovators, we expanded our pool of i2a early adopters by opening up i2a Institute registration to any staff member, regardless of rank or professional title. In doing this, we created the conditions for innovative projects that explicitly used the Paul-Elder critical thinking framework to take root among diverse sets of groups and programs we could not have predicted at the start of our initiative.

Our commitment to widening the scope of those who could get introduced to the tenets of the Paul-Elder framework supports Elder’s prescription that any institution that wishes to commit to taking critical thinking seriously as a central part of its work must choose a substantive concept of critical thinking, must provide ongoing faculty and staff workshops, and must be inclusive in inviting individuals into the effort, thus ensuring the work is not reserved for an exclusive group of practitioners (2011).

VII. Critical Thinking Infusion in University Libraries

Our staff colleagues had a variety of

motivations for embracing the Paul-Elder framework and its core critical thinking concepts. Overall, they reported that i2a was an external catalyst inviting them to re-focus on programmatic goals that were already a priority for them. Richard Paul's critical thinking framework with its specific concepts, tools, and terminology combined with our specific programs to offer a supportive venue for faculty to re-tool and enhance their students' intellectual development.

Faculty librarians Anna Marie Johnson and Robert Detmering attended one of the first offerings of the i2a Institute. They were looking for an opportunity to get engaged in the QEP and felt our adopted critical thinking framework could yield benefits for their commitment to promoting information literacy with undergraduates. Their traditional strategy for teaching information literacy took place during a "one shot" session—face to face or online--in which they took a tool-based approach when walking students through information-seeking strategies, using databases and seeking sources for research papers and other scholarly activities. They soon discovered this method put the emphasis in the wrong place and focused on the "practical concerns" of finding information. They missed their mark of "teaching students to think more critically about information and the information-seeking process as a whole. In other words, our instruction sometimes fails to help students conceptualize research in a larger sense, as a process of critical thinking, primarily because time constraints compel us to focus on students' immediate needs" (Detmering and Johnson, 2011, p.103). Their former emphasis on the nuts and bolts of how to search for information overshadowed their ultimate, and far more important, aim of helping students think through the research process itself, from a critical perspective.

At the i2a Institute, Gerald Nosich introduced Johnson and Detmering to the idea of "fundamental and powerful" concepts. Nosich

provides this explanation of a fundamental and powerful concept:

A fundamental and powerful concept is one that can be used to explain a huge body of questions, problems, information and situations. All fields have f&p concepts, but there are a relatively small number of them in any particular area. They are to be contrasted with individual bits of information, or with less general concepts (Nosich, 2011, p. 106).

Johnson and Detmering found the idea of fundamental and powerful concepts attractive in their specific teaching situation because these concepts allow librarians or research instructors to "refocus our instruction on broader concepts that students can utilize to 'explain or think out' all aspects of the research process." (Detmering and Johnson, 2011, p. 104). What students could adopt in that one-time session was a new mental model of research as a process of inquiry, discovery, and judgment, rather than simply a laundry list of databases, tools and tips for using an online search box.

With this critical thinking approach in mind, Johnson and Detmering revised an information literacy module for an introductory course for business majors called Business Campus Culture (BCC), to address the nature and context of business research at the college level. Using both the Paul-Elder framework and the idea of fundamental and powerful concepts, they shifted the central focus away from search techniques and foregrounded three fundamental and powerful concepts to shape students' thinking about the nature of information and how it is organized and made available to them:

1. *Evaluation of information:*
Understanding the importance of reading and evaluating information critically.

1. *Organization of information:*
Understanding that information is organized in different ways or perhaps not organized at all.
2. *Diversity of information:*
Understanding that there are many different types of information sources that may or may not be useful in different situations.

Johnson and Detmering assert that these fundamental and powerful concepts are instructive for all types of research settings, not just for their business students' contexts. Furthermore, the module asks students to think critically not only about the search process itself and the relevance of sources, but also it guides students to think through how a given source informs or alters one's point of view on a research question. "In this sense, the fundamental and powerful concepts become a pathway to understanding critical thinking itself, which is crucial if students are to develop as engaged thinkers in all their endeavors" (Detmering and Johnson, 2011, p. 107). This revised information literacy module served both to guide students in an explicit process to foster their critical thinking about research processes while also encouraging them to be actively critical and engaged with the information they find, allowing it to alter, extend, and advance their thinking about the research topic itself.

VIII. Critical Thinking Infusion in the Tutoring Center

Another staff colleague, Julie Hohman, participated in the i2a staff learning community program and saw the potential of the Paul-Elder framework in her particular setting with students. She believed the framework could support both peer tutors and their students in thinking critically and making meaning of material during small-group tutoring sessions offered through the Learning Resource Center. Hohman's goal was to "create a rubric to

measure students' ability to think critically about concepts covered during a tutoring session and to induce students to connect learning to meaning" (Hohmann & Grillo, 2014, 43). Peer tutors who had reached certification as "master tutors" were taught to be critical thinking coaches to "motivate and encourage students to form essential questions about the material, to motivate and encourage students to form essential quests about the material, and make connections among concepts (Hofmann & Grillo, 2014, p. 42). The rubric she created in collaboration with the i2a staff team measured students' capacity for critical thinking using the following components of the critical thinking framework: question and problem; information; intellectual perseverance; and intellectual autonomy.

Hohman first trained her master tutors in the Paul-Elder critical thinking framework, teaching them to formulate a central question on a specific topic or problem that would serve as the primary focus of each tutoring session over the course of weekly sessions. At the conclusion of each tutoring session, the master tutor completed the rubric to assess and capture evidence related to each student-client's critical thinking abilities on a scale of one to four. Like Detmering and Johnson, Hohmann's selection of some aspects of the Paul-Elder framework allowed her to highlight the specific intellectual abilities and traits she wanted her student-clients to cultivate.

These specific aspects of the framework were deemed suitable for this study as they coincided with the mission of our Learning Resource Center and had potential to assist students in overcoming common barriers they faced during tutoring sessions. The typical hurdles of their struggling students included the inability to identify "essential questions to ask about course material and gathering and organizing important information in order to gain clarity and make connections between concepts" (Hohmann & Grillo, 2014, p. 43). Thus the tutoring sessions were

more than an opportunity to help students strengthen their academic performance. The coaching conversations between master tutor and student-client were structured to help students practice and develop vital questioning behaviors about their sometimes difficult experience as learners in order to identify problems, gather relevant information, and persist as novice thinkers who must learn to think conceptually about unfamiliar academic material and continue despite confusion or difficulty. The concept of asking essential questions emerges out of the work of Richard Paul and other scholars working in this tradition. (Elder and Paul, 2009).

The results of the two-year study using the critical thinking rubric confirmed Hohmann's hypothesis that "repeated use of the rubric was associated with an increase in final course grades," even though the total hours spent in tutoring were not a statistically significant factor. "This suggests that repeated use of the rubric is more effective in improving course performance than the amount of time spent in tutoring sessions is." (Hohman & Grillo, 2014, p. 45). The students who demonstrated a higher level of critical thinking skills, as determined by their rubric scores, also earned higher course grades in the subject that was the focus of the tutoring session. Through focused questioning strategies and an intentional emphasis on students' abilities to fully grasp information, solve problems independently, and persevere while learning challenging concepts, the master tutors were able to advance their students' thinking skills while assisting them in accomplishing learning goals in a course. Additionally, master tutors reported that as a result of participating in the study, they noticed their own critical thinking skills and tutoring skills were enhanced.

Hohmann's creation and application of a new rubric, along with Detmering and Johnson's module revision, illuminate the power of critical thinking to help staff members take a developmental approach to

influencing the thinking of their students. These examples highlight the fact that the work we were asking of faculty and staff was not a hollow "add on" to their already long list of priorities. Rather, the Paul-Elder framework offered them a significant, expansive, and deep set of concepts and tools that could richly enhance their work with others.

IX. The Infusion of Critical Thinking in Academic Advising

A related effort to break new ground in fostering students' critical thinking abilities was taken up by two leaders in our institution's Undergraduate Advising Practice unit. Janet Spence and Nora Scobie participated in our first staff learning community and immediately concluded that the Paul-Elder framework could be leveraged to supplement typical academic advising practices as part of a technique called "intrusive" or "proactive" advising to deliver to a subset of students on academic probation. This proactive technique of advising includes more frequent communications and face-to-face contact between advisor and advisee. Spence and Scobie worked with us to co-design and co-lead their own form of learning community for academic-advising colleagues. They asked us to assist them in learning the foundational principles of the Paul-Elder framework in order to better engage and support struggling students through ongoing dialogue and training in critical thinking principles. This project was called the Academic Improvement Model.

Over the course of the Academic Improvement Model's year-long learning community, it became clear that using critical thinking concepts to engage students in advising conversations had promise for supporting the growth and improvement of all students, not just those in academic distress. Spence and Scobie brought together best practices from their own field in academic advising, a new appreciation for the universal applicability of the Paul-Elder framework, and

the dialectic method of Socratic inquiry and labeled their technique “Socratic Advising.” Their Socratic approach to advising

teaches students to become self-aware thinkers who can analyze their own thought processes, beliefs and behaviors. When students recognize inconsistent or faulty thinking, challenge long-held belief systems, and fully explore desired outcomes, they become engaged learners who take full responsibility for their own actions. The Socratic process helps students become more autonomous, independent and resilient (Spence and Scobie, 2013, p. 198).

This goal, reaching far beyond simply helping students get back on-track academically, echoes the efforts of their colleagues Hohmann and Grillo who discovered that both broadening the scope and sharpening the focus their interactions with students to include probing questions and metacognitive conversations, rather than simply assisting them to perform at an intellectual task, generated lasting benefits for learners. Socratic advising walks students through a process of critically examining firmly-held beliefs about academic majors or career options, surfacing implicit assumptions about their own experiences or choices, and exploring the implications of their behavior. By helping advisees “analyze, deconstruct, and reconstruct” their thought processes, advisors guide students to develop more lucid choices and well-reasoned goals (Spence and Scobie, 2013, p. 203).

The Socratic advising model as articulated by the cohort of their advisors includes: (1) selected elements of the Paul-Elder framework, (2) an assessment of student thinking, (3) Socratic questioning, (4) a proactive advising style, (5) helping techniques, and (6) a teaching and learning approach. To aid advisors in fostering Socratic dialogue with students on academic probation,

for example, they developed a “Socratic questioning toolbox” with questions based on the eight Elements of Thought and the eight Intellectual Standards. Sample questions include those based on *concepts* “Why do you think the university places students on academic probation?”, *point of view* “From your point of view, why do you think you were placed on academic probation?”, and *relevance* “What issues are impacting your academic standing?” (Spence and Scobie, 2013, p. 208-209).

The authors stress that the Socratic advising approach is not a magic bullet; it requires time, patience and discipline on the part of both the advisor and advisee. The advisor must pay attention to the readiness of the student as a thinker and must recognize that the Socratic advising approach can lead to cognitive dissonance and confusion, and that dissonance either may fail to move the student forward or it may succeed in opening the door to profound realizations.

These three innovative programs designed and led by our staff colleagues represent a rethinking and revitalization of typical services related to libraries, tutoring programs, and academic advising offered on almost every campus. They are not a perfunctory nod to helping our campus meet the expectations of SACS-COC. Many of our faculty colleagues reported that the journey to make critical thinking an explicit part of their teaching and assessment of students refreshed and renewed their commitment to their professional priorities.

X. In Conclusion

Many of our colleagues’ i2a-related publications and presentations can be accessed on our i2a website: <http://louisville.edu/ideastoaction/resources/research>. Our prolonged, sustained commitment to making critical thinking skill building an explicit part of campus culture continues on, even as we

begin to prepare our next QEP for review by SACS-COC in 2017.

We ourselves have been buoyed and energized by the hundreds of faculty and staff members who spent many personal and professional hours working with us to advance their own thinking and discover how to advance the thinking of their students. Our original i2a goals were focused exclusively on how to help students foster and apply critical thinking, and yet it was impossible to engage students in this work if we ourselves did not take a metacritical and deep dive into our own thinking processes and programmatic choices as professional educators. Our own commitment, as leaders of i2a, to applying the principles of critical thinking earned us credibility with our colleagues who we asked to participate in our development programs such as the learning community (Cosgrove, 2013). As we gained facility with the principles of the Paul-Elder framework, we discovered that its use brought greater clarity, intentionality, and depth to our methods for implementation of i2a and induced us to make our thinking and decision-making process transparent and explicit with our colleagues; this, in turn, helped them do the same with their students and coworkers.

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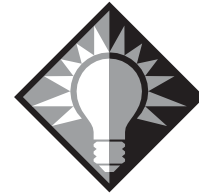
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