✦✦ Chapter 4

Critical Thinking in North America

Abstract

In this paper, Richard Paul sets out his conception of the emerging critical theory of education, in contrast to the standard didactic theory of education. "The root concept of the educated literate person as critical thinker is not theoretically new .... What is new is its progressive development across a variety of academic domains and its unifying foundation as a basis for addressing a variety of emerging educational, social, and economic concerns."

Students are not learning "to work by, or think for, themselves." "Neither are they learning how to gather, analyze, synthesize, and assess information, how to analyze questions and problems, how to enter sympathetically into the thinking of others, how to deal rationally with conflicting points of view. They do not use their native languages clearly, precisely, or persuasively." Most importantly, Paul argues, students gain little knowledge *since, for the most part, they could not explain the basis for what they believe. They do not, therefore, become "literate," in Paul's conception of the word.*

Paul names the source of these problems as a didactic conception of education — simplistic, fragmented, and inaccurate — which has shaped instructional theory and practice, and which primarily arose from schools' historical role of indoctrinating people to fit into narrow, isolated societies, a situation changing in the modern world of global communication and interdependence. Research and theoretical work on numerous fronts are developing and reflecting a contrasting theory of education which Paul explicates and links to critical thinking. The broadness and complexity of the emerging concept of critical thinking can be seen in the variety of definitions of it. After setting out numerous definitions, Paul sets out one of his own in some detail and explores its key features: perfections of thought, elements of thought, and domains of thought. Paul closes by citing research that supports his view of critical teaching.

✦ *Introduction*

There is a critical thinking movement gaining momentum at all levels of education today. Its epicenter is in North America but its influence is being felt in Europe and beyond. It is manifested in a burgeoning variety of research projects and papers, in educational manifestoes and mandates, in new curriculum articulations, in far-reaching philosophical critique, and in a spate of efforts to "restructure" schools.

The root concept of the educated literate person as critical thinker is not theoretically new but can be traced to the ancient Socratic model of the learner as a systematic, probing questioner and dialectical reasoner striving

to live a reflective and rational life. (Paul, 1987) (Siegel, 1980, 1988) What is new is its progressive development across a variety of academic domains and its unifying foundation as a basis for addressing a variety of emerging educational, social, and economic concerns.

On the economic front, developed nations must increasingly generate workers who can think critically for a living. Evidence of this growing perception is illustrated in an open letter, drafted by the president of Stanford University, Donald Kennedy, co-signed by 36 other college leaders from across the U.S., and sent to 3,000 college and university presidents (Sept. 18, 1987). It warned of "a national emergency ... rooted ... in the revolution of expectations about what our schools must accomplish:"

> It simply will not do for our schools to produce a small elite to power our scientific establishment and a larger cadre of workers with basic skills to do routine work.... Millions of people around the world now have these same basic skills and are willing to work twice as long for as little as one-tenth our basic wages.... To maintain and enhance our quality of life, we must develop a leading-edge economy based on workers who can think for a living.... If skills are equal, in the long run wages will be too. This means we have to educate a vast mass of people capable of thinking critically, creatively, and imaginatively.

On the social and political fronts, both developed and underdeveloped nations face complex problems that cannot be solved except with significant conceptual shifts on the part of large masses of people. Such large-scale shifts presuppose increased reflective and critical thought about deep-seated problems of environmental damage, human relations, over-population, rising expectations, diminishing resources, global competition, personal goals, and ideological conflict. Simultaneously, as war and preparation for war waste more and more resources, the battle for world political hegemony, which fuels this waste, becomes increasingly unacceptable. One result is an increasing drive to challenge the world-wide academic *status quo,* a *status quo* whose outdated and simplistic theoretical underpinnings invite serious attack, and to build in its place modes of education better suited to the demands of emerging world problems. A multi-dimensional, interdependent world cannot be fathomed by people schooled in fragmented, monological specialties or steeped in nationalist myopia. Most problems are multi-dimensional, logically messy, require interdisciplinary analysis and synthesis, deeply involve values and priorities, and demand sympathetic consideration of conflicting points of view or frames of reference.

Monological analysis will not solve multilogical problems. Specialists whose main *forte* is reductive thinking within a discipline offer little toward solving such problems. The lay person, bombarded with diverse contradictory explanations and prescriptions, retreats to simplistic pictures of the world. The growing mass media feed this demand for simple-minded answers. A new concept of knowledge, learning, and literacy more in tune with the modern world is emerging, however; one designed to engender people comfortable

with dialogical and dialectical thinking, at home with complexity and ambiguity, who can adjust their thinking to accelerating changes, who do not fixate on their present beliefs, people not easily manipulated or taken in by propaganda. (Scriven 1985) The theoretical foundation for this need and its fulfillment is now accumulating a solid research base. Its academic implementation is merely beginning; its full development around the world is years in the future.

✦ *Two Conflicting Theories of Knowledge, Learning, and Literacy: The Didactic and the Critical*

Most instructional practice in most academic institutions around the world presupposes a didactic theory of knowledge, learning, and literacy, ill-suited to the development of critical minds and literate persons. After a superficial exposure to reading, writing, and arithmetic, schooling is typically fragmented into more or less technical domains each with a large vocabulary and an extensive content or propositional base. Students "take in" and reiterate domain-specific details. Teachers lecture and drill. Students rarely integrate their daily non-academic experiences. Teachers spend little time stimulating student questions. Students are rarely encouraged to doubt what they hear in the classroom or read in their texts. Students' personal points of view or philosophies of life are considered largely irrelevant to education. In most classrooms teachers talk and students listen. Dense and typically speedy coverage of content is usually followed by content-specific testing. Students are drilled in applying formulas, skills, and concepts, then tested on nearly identical items. Instructional practices fail to require students to *use* what they learn when appropriate. Practice is stripped of meaning and purpose.

Interdisciplinary synthesis is ordinarily viewed as the personal responsibility of the student and is not routinely tested. Technical specialization is considered the natural goal of schooling and is correlated with getting a job. Few multi-logical issues or problems are discussed or assigned and even fewer teachers know how to conduct such discussions or assess student participation in them. Students rarely engage in dialogical or dialectical reasoning and few teachers can analyze such reasoning. Knowledge is viewed as verified intra-disciplinary propositions and well-supported intra-disciplinary theories. There is little or no discussion of the nature of prejudice or bias, little or no discussion of metacognition, little or no discussion of what a disciplined, self-directed mind or self-directed thought require. We expect students to develop into literate, educated persons from years of content memorization and ritual performance.

The above dominant pattern of academic instruction and learning assumes an uncritical theory of knowledge, learning, and literacy coming under increasing critique by those concerned with instruction fitted to new

interpretations of the emerging economic and social conditions and changing conditions for human survival. (Passmore, 1967) (Scheffler 1973, 1965) Those whose teaching reflects the didactic theory rarely formulate it explicitly. Some would deny that they hold it, though their practice implies it. In any case, it is with the theory implicit in practice that we are concerned.

Now let's examine the two opposing theories systematically in terms of specific contrasting assumptions.

Theory of Knowledge, Learning, and Literacy	
Didactic Theory	***Critical Theory***
1. The fundamental needs of students	
That the fundamental need of students is to be taught more or less *what* to think, not *how* to think (that is, that students will learn how to think if they can only get into their heads what to think). ♦ Students are "given" or told details, definitions, explanations, rules, guidelines, reasons to learn.	That the fundamental need of students is to be taught *how* not *what* to think; that it is important to focus on significant content, but this should be accomplished by raising live issues that stimulate students to gather, analyze, and assess that content.
2. The nature of knowledge	
That knowledge is independent of the thinking that generates, organizes, and applies it. ♦ Students are said to *know* when they can repeat what has been covered. Students are given the finished products of someone else's thought.	That all knowledge of "content" is generated, organized, applied, analyzed, synthesized, and assessed by thinking; that gaining knowledge is unintelligible without engagement in such thinking. (It is *not* assumed that one can think without some content to think about, nor that all content is equally significant and useful.) ♦ Students are given opportunities to puzzle their way through to knowledge and explore its justification, *as part of* the process of learning.
3. Model of the educated person	
That educated, literate people are fundamentally repositories of content analogous to an encyclopedia or a data bank, directly comparing situations in the world with facts that they carry about fully formed as a result of an absorptive process. That an educated, literate person is fundamentally a true believer, that is, a possessor of truth, and therefore claims much knowledge.	That an educated, literate person is fundamentally a repository of strategies, principles, concepts, and insights embedded in processes of thought rather than in atomic facts. Experiences analyzed and organized by critical thought, rather than facts picked up one-by-one, characterize the educated person. Much of what is known is constructed by the thinker *as needed* from

Theory of Knowledge, Learning, and Literacy	
Didactic Theory	***Critical Theory***
♦ Texts, assignments, lectures, discussions, and tests are detail-oriented, and content dense.	context to context, not *prefabricated* in sets of true statements about the world. That an educated, literate person is fundamentally a seeker and questioner rather than a true believer, therefore cautious in claiming knowledge. ♦ Classroom activities consist of questions and problems for students to discuss and discover how to solve. Teachers model insightful consideration of questions and problems, and facilitate fruitful discussions.
4. The nature of knowledge	
That knowledge, truth, and understanding can be transmitted from one person to another by verbal statements in the form of lectures or didactic teaching. ♦ For example, social studies texts present principles of geography and historical explanations. Questions at the end of the chapter are framed in identical language and can be answered by repeating the texts. "The correct answer" is in bold type or otherwise emphasized.	That knowledge and truth can rarely, and insight never, be transmitted from one person to another by the transmitter's verbal statements alone; that one cannot directly give another what one has learned — one can only facilitate the conditions under which people learn for themselves by figuring out or thinking things through. ♦ Students offer their own ideas and explore ideas given in the texts, providing their own examples and reasons. Students come to conclusions by practicing reasoning historically, geographically, scientifically, etc.
5. The nature of listening	
That students do not need to be taught skills of listening to learn to pay attention and this is fundamentally a matter of self-discipline achieved through will power. Students should therefore be able to listen on command by the teacher. ♦ Students are told to listen carefully and are tested on their abilities to remember details and to follow directions.	That students need to be taught how to listen critically — an active and skilled process that can be learned by degrees with various levels of proficiency. Learning what others mean by what they say requires questioning, trying on, testing, and, hence, engaging in public or private dialogue with them, and this involves critical thinking. ♦ Teachers continually model active critical listening, asking probing and insightful questions of the speaker.

Theory of Knowledge, Learning, and Literacy	
Didactic Theory	***Critical Theory***
6. The relationship of basic skills to thinking skills	
That the basic skills of reading and writing can be taught without emphasis on higher order critical thinking. ♦ Reading texts provide comprehension questions requiring recall of random details. Occasionally, "main point," "plot," and "theme" lessons cover these concepts. Literal comprehension is distinguished from "extras" such as inferring, evaluating, thinking beyond. Only after basic literal comprehension has been established is the deeper meaning probed.	That the basic skills of reading and writing are inferential skills that require critical thinking; that students who do not learn to read and write critically are ineffective readers and writers, and that critical reading and writing involve dialogical processes in which probing critical questions are raised and answered. (For example, What is the fundamental issue? What reasons, what evidence, is relevant to this issue? Is this source or authority credible? Are these reasons adequate? Is this evidence accurate and sufficient? Does this contradict that? Does this conclusion follow? Is another point of view relevant to consider?) ♦ Teachers routinely require students to *explain* what they have read, to reconstruct the ideas, and to evaluate written material. Students construct and compare interpretations, reasoning their way to the most plausible interpretations. Discussion moves back and forth between what was said and what it means.
7. The status of questioning	
That students who have no questions typically are learning well, while students with a lot of questions are experiencing difficulty in learning; that doubt and questioning weaken belief.	That students who have no questions typically are not learning, while having pointed and specific questions, on the other hand, is a significant sign of learning. Doubt and questioning, by deepening understanding, strengthen belief by putting it on more solid ground. ♦ Teachers evaluate their teaching by asking themselves: Are my students asking better questions — perceptive questions, questions which extend and apply what they have learned? ("Is that why ...?" Does this mean that ...?" "Then what if ...?")

Theory of Knowledge, Learning, and Literacy	
Didactic Theory	***Critical Theory***
8. The desirable classroom environment	
That quiet classes with little student talk are typically reflective of students learning while classes with a lot of student talk are typically disadvantaged in learning.	That quiet classes with little student talk are typically classes with little learning while classes with much student talk focused on live issues is a sign of learning (provided students learn dialogical and dialectical skills).
9. The view of knowledge (atomistic vs. holistic)	
That knowledge and truth can typically be learned best by being broken down into elements, and the elements into sub-elements, each taught sequentially and atomically. Knowledge is additive. ♦ Texts provide basic definitions and masses of details, but have little back-and-forth movement between them. They break knowledge into pieces, each of which is to be mastered one by one: subjects are taught separately. Each aspect is further broken down: each part of speech is covered separately; social studies texts are organized chronologically, geographically, etc.	That knowledge and truth is heavily systemic and holistic and can be learned only by many on-going acts of synthesis, many cycles from wholes to parts, tentative graspings of a whole guiding us in understanding its parts, periodic focusing on the parts (in relation to each other) shedding light upon the whole, and that the wholes that we learn have important relations to other wholes as well as their own parts and hence need to be frequently canvassed in learning any given whole. (This assumption has the implication that we cannot achieve in-depth learning in any given domain of knowledge unless the process of grasping that domain involves active consideration of its relation to other domains of knowledge.) That each learner creates knowledge. ♦ Education is organized around issues, problems, and basic concepts which are pursued and explored through all relevant subjects. Teachers routinely require students to relate knowledge from various fields. Students compare analogous events or situations, propose examples, apply new concepts to other situations.

Theory of Knowledge, Learning, and Literacy	
Didactic Theory	***Critical Theory***
10. The place of values	
That people can gain significant knowledge without seeking or valuing it, and hence that education can take place without significant transformation of values for the learner. ♦ For example, texts tend to inform students of the importance of studying the subject or topic covered, rather than proving it by *showing* its immediate usefulness and having students use it.	That people gain only the knowledge they seek and value. All other learning is superficial and transitory. All genuine education transforms the basic values of the person educated, resulting in persons becoming life-long learners and rational persons. ♦ Instruction poses problems meaningful to students, requiring them to use the tools of each academic domain.
11. The importance of being aware of one's own learning process	
That understanding the mind and how it functions, its epistemological health and pathology, are not important or necessary parts of learning. To learn the basic subject matter of the schools one need not focus on such matters, except perhaps with certain disadvantaged learners.	That understanding the mind and how it functions, its health and pathology, are important and necessary parts of learning. To learn subject matter in-depth, we must gain some insight into how we as thinkers and learners process that subject matter.
12. The place of misconceptions	
That ignorance is a vacuum or simple lack, and that student prejudices, biases, misconceptions, and ignorance are automatically replaced by their being given knowledge. ♦ Little if any attention is given to students' beliefs. Material is presented from the point of view of the authority, the one who knows.	That prejudices, biases, and misconceptions are built up through actively constructed inferences embedded in experience and must be broken down through a similar process; hence, that students must reason their way dialogically and dialectically out of their prejudices, biases, and misconceptions. ♦ Students have many opportunities to express their views in class, however biased or prejudiced, and a non-threatening environment to argue their way out of their internalized misconceptions. Teachers cultivate in themselves genuine curiosity about how students see things, why they think as they do, and the structure of students' thought. The educational process starts where students are, and walks them through to insight.

Theory of Knowledge, Learning, and Literacy	
Didactic Theory	***Critical Theory***
13. The level of understanding desired	
That students need not understand the rational ground or deeper logic of what they learn to absorb knowledge. Extensive but superficial learning can later be deepened. ♦ For example, historical and scientific explanations are presented to students as givens, not as having been reasoned to. In language arts, skills and distinctions are rarely explicitly linked to such basic ideas as 'good writing' or 'clear expression.'	That rational assent is an essential facet of all genuine learning and that an in-depth understanding of basic concepts and principles is an essential foundation for rational concepts and facts. That in-depth understanding of root concepts and principles should be used as organizers for learning within and across subject matter domains. ♦ Students are encouraged to discover how the details relate to basic concepts. Details are traced back to the foundational purposes, concepts, and insights.
14. Depth versus breadth	
That it is more important to cover a great deal of knowledge or information superficially than a small amount in depth. That only after the facts are understood, can students discuss their meaning; that higher order thinking can and should only be practiced by students who have mastered the material. That thought-provoking discussions are for the gifted and advanced, only.	That it is more important to cover a small amount of knowledge or information in depth (deeply probing its foundation) than to cover a great deal of knowledge superficially. That all students can and must probe the significance of and justification for what they learn.
15. Role definition for teacher and student	
That the roles of teacher and learner are distinct and should not be blurred.	That we learn best by teaching or explaining to others what we know. ♦ Students have many opportunities to teach what they know, to formulate their understanding in different ways, and to respond to questions from others.

Theory of Knowledge, Learning, and Literacy	
Didactic Theory	***Critical Theory***
16. The correction of ignorance	
That the teacher should correct the learners' ignorance by telling them what they do not know.	That students need to learn to distinguish for themselves what they know from what they do not know. Students should recognize that they do not genuinely know or comprehend what they have merely memorized. Self-directed recognition of ignorance is necessary to learning. ♦ Teachers respond to mistakes and confusion by probing with questions, allowing students to correct themselves and each other. Teachers routinely allow students the opportunity to supply their own ideas on a subject before reading their texts.
17. The responsibility for learning	
That the teacher has the fundamental responsibility for student learning. Teachers and texts provide information, questions, and drill.	That progressively the student should be given increasing responsibility for his or her own learning. Students need to come to see that only they can learn for themselves and that they will not do so unless they actively and willingly engage themselves in the process. ♦ The teacher provides opportunities for students to decide what they need to know and helps them develop strategies for finding or figuring it out.
18. The transfer of learning to everyday situations	
That students will automatically transfer the knowledge that they learn in didactically taught courses to relevant real-life situations. ♦ For example, students are told to perform a given skill on a given group of items. The text will *tell* students when, how, and why to use that skill.	That most knowledge that students memorize in didactically taught courses is either forgotten or rendered "inert" by their mode of learning it, and that the most significant transfer is achieved by in-depth learning which focuses on experiences meaningful to the student and aims directly at transfer.
19. Status of personal experiences	
That the personal experience of the student has no essential role to play in education.	That the personal experience of the student is essential to all schooling at all levels and in all subjects; that it is a crucial part of the content to be processed (applied, analyzed, synthesized, and assessed) by the student.

Theory of Knowledge, Learning, and Literacy	
Didactic Theory	***Critical Theory***
20. The assessment of knowledge acquisition	
That a student who can correctly answer questions, provide definitions, and apply formulae while taking tests has proven his or her knowledge or understanding of those details. Since the didactic approach tends to assume, for example, that knowing a word is knowing its definition (and an example), didactic instruction tends to overemphasize definitions. Students practice skills by doing exercises, specifically designed as drill. Successfully finishing the exercise is taken to be equivalent to having learned the skill.	That students can often provide correct answers, repeat definitions, and apply formulae while yet not understanding those questions, definitions, or formulae. That proof of knowledge or understanding is found in the students' ability to explain in their own words, with examples, the meaning and significance of the knowledge, why it is so, and to *spontaneously* recall and use it when relevant.
21. The authority validating knowledge	
That learning is essentially a private, monological process in which learners can proceed more or less directly to established truth, under the guidance of an expert in such truth. The authoritative answers that the teacher has are the fundamental standards for assessing students' learning.	That learning is essentially a public, communal, dialogical, and dialectical process in which learners can only proceed indirectly to truth, with much "zigging and zagging" along the way, much back-tracking, misconception, self-contradiction, and frustration in the process. In this process, authoritative answers are replaced by authoritative standards for engagement in the communal, dialogical process of enquiry.

✦ *A Glimpse at the Historical and Social Background of Didactic Instruction and Uncritical Learning*

The didactic theory of knowledge, learning, and literacy, though unsuited to in-depth learning or critical thinking, has been functional to some extent for the maintenance of routine life in what have been to date largely uncritical societies. Schooling has been first and last a social process, reflecting ascendant social forces and thinking largely subservient to them. Much of what happens in schools results from social and economic decisions made predominantly by non-academics. Epistemo-logic is traditionally subordinate to socio-logic.

We must remember that knowledge, however extensive, is a highly limited social construction out of an infinitude of possible such constructions. Although all humans live in a veritable sea of potentially expressible truths, they express only a few of them, only a few become knowledge. The constraints that we must live within inevitably limit the social production of knowledge. We are therefore highly selective and directional in that production. We don't randomly express truths. We systematically seek the knowledge which serves our interests, meets our needs, and solves our problems. The human mind and social life being what it is, we generate a good deal of pseudo-knowledge intermixed with the genuine. We also avoid producing and disseminating knowledge that might undermine our social engagements and vested interests. Not all learning is ipso facto rational, and irrational practices are often deeply embedded in day-to-day social life. We do this spontaneously and naturally, without guile or conscious malice. We are not *truth* seekers by nature but *functional knowledge* seekers. And widely accepted pseudo-knowledge is often quite functional. Hence, to take an obvious example, in a racist society it is functional to be racist. Rationally unjustified beliefs often enable us to get ahead and stay out of trouble. Ordinary social life, whether we like it or not, is filled with innumerable functional falsehoods.

As long as societies functioned primarily as self-contained systems independent of each other and the repercussions of economic, social, and political conflicts were manageable, functional falsehoods and suppressed knowledge (the avoidance of unpleasant truth) was tolerable. We should remember that the systematic search for particular dimensions of knowledge as an organized and specialized endeavor is itself quite recent in human history. It is at most 2,000 years old while the species is somewhere between 1,000,000 and 3,000,000 years old. Most disciplines have emerged as significant endeavors only within the last 300 or so years. Wholesale mass schooling is only about 100 years old. Schools and socialization historically have armed the mass of people with minimum levels of superficial knowledge, functional falsehoods, and socially approved biases. Only a few were encouraged to approach the ideal of critical thought, and even these only in a limited way. As scientific disciplines emerged it became necessary for some to understand particular disciplines deeply. What Kant called *scientific ignorance* — knowing clearly what we do not yet know — became necessary for advancing intra-disciplinary progress. But most people were not expected to contribute to the advances in specialized disciplines, only to use in a limited way some tools that a technological application of those advances made possible.

Furthermore, the overwhelming majority of people were each expected to find a particular niche within the complex structures of social life, not to engage in social critique, not to detect social contradictions, not to expose pseudo-knowledge or to articulate suppressed knowledge. That learning was all of a piece for the typical (uncritical) learner — truth, half-truth, bias, and falsehood blended together — created no insoluble economic or social problems for society. Problems aplenty there were, but on the whole people in the

same societies shared the same basic beliefs, true or false, rational or irrational. Anarchy did not result from the fact that "Truth" meant no more in the last analysis to ordinary people than "We believe it" or "It agrees with our beliefs" or "It was said by someone with authority and prestige."

But the relative homogeneity and isolation of societies began to break down with the advent of science and the emergence of a technological world. More and more individuals became, are increasingly becoming, aware of differences in belief, not just of people outside but of people inside their societies as well. And interdependence has dramatically and increasingly emerged. What were previously local decisions with nothing more than local consequences are becoming international matters. Knowledge production and dissemination can no longer be premised on an intra-societal world and humanity cannot survive indefinitely with masses of people whose ultimate *de facto* test of knowledge is personal desire or social conformity.

✦ *What, Then, Is Critical Thinking?*

It is certainly of the nature of the human mind to think — spontaneously, continuously, and pervasively — but it is not of the nature of the human mind to think critically about the standards and principles guiding its spontaneous thought. It has no built-in drive to question its innate tendency to believe what it wants to believe, what makes it comfortable, what is simple rather than complex, and what is commonly believed and socially rewarded. The human mind is ordinarily at peace with itself as it internalizes and creates biases, prejudices, falsehoods, half-truths, and distortions. Compartmentalized contradictions do not, by their very nature, disturb those who take them in and selectively use them. The human mind spontaneously experiences itself as in tune with reality, as directly observing and faithfully recording it. It takes a special intervening process to produce the kind of self-criticalness that enables the mind to effectively and constructively question its own creations. The mind spontaneously but uncritically invests itself with epistemological authority with the same ease with which it accepts authority figures in the world into which it is socialized.

Learning to think critically is therefore an extraordinary process that cultivates capacities merely potential in human thought and develops them at the expense of capacities spontaneously activated from within and reinforced by normal socialization. It is not normal and inevitable or even common for a mind to discipline itself within a rational perspective and direct itself toward rational rather than egocentric beliefs, practices, and values. Yet it is possible to describe the precise conditions under which critical minds can be cultivated. The differences between critical and uncritical thought are increasingly apparent.

Nonetheless, because of the complexity of critical thinking — its relationship to an unlimited number of behaviors in an unlimited number of situa-

tions, its conceptual interdependence with other concepts such as the critical person, the critical society, a critical theory of knowledge, learning, and literacy, and rationality, not to speak of the opposites of these concepts — one should not put too much weight on any particular definition of critical thinking. Distinguished theoreticians have formulated many useful definitions which highlight important features of critical thought. Harvey Siegel has defined critical thinking as "thinking appropriately moved by reasons". This definition highlights the contrast between the mind's tendency to be shaped by phenomena other than reasons: desires, fears, social rewards and punishments, etc. It points up the connection between critical thinking and the classic philosophical ideal of rationality. Yet clearly the ideal of rationality is itself open to multiple explications. Similar points can be made about Robert Ennis' and Matthew Lipman's definitions.

Robert Ennis defines critical thinking as "rational reflective thinking concerned with what to do or believe". This definition usefully calls attention to the wide role that critical thinking plays in everyday life, for, since all behavior depends on what we believe, all human action depends upon what we in some sense *decide* to do. However, like Siegel's definition it assumes that the reader has a clear concept of rationality and of the conditions under which a decision can be said to be "reflective". There is also a possible ambiguity in Ennis' use of 'reflective'. As a person internalizes critical standards the application of these standards to action becomes more automatic, less a matter of conscious effort, hence less a matter of overt "reflection", assuming that Ennis means to imply by 'reflection' a special consciousness or deliberateness.

Matthew Lipman defines critical thinking as "skillful, responsible, thinking that is conducive to judgment because it relies on criteria, is self-correcting, and is sensitive to context". This definition is useful insofar as one clearly understands the difference between responsible and irresponsible thinking, as well as what the appropriate self-correction of thought, the appropriate use of criteria, and appropriate sensitivity to context mean. Of course, it would be easy to find instances of thinking that were self-correcting, used criteria, and responded to context *in one sense* and nevertheless were *uncritical* in some other sense. One's criteria might be uncritically chosen, for example, or the manner of responding to context might be critically deficient in numerous ways.

I make these points not to deny the usefulness of these definitions, but to point out limitations in the process of definition itself when addressing a complex concept such as critical thinking. Rather than to work solely with one definition of critical thinking, it is better to retain a host of definitions, for two reasons: *1)* to maintain insight into the various dimensions of critical thinking that alternative definitions highlight, and *2)* to help oneself escape the limitations of each. In this spirit I will present a number of my definitions of the cluster of concepts whose relationship to each other is fundamental to critical thinking. These concepts are: critical thinking, uncritical thinking, sophistic critical thinking, and fair-minded critical thinking. After so doing, I will analyze one definition at length.

CRITICAL THINKING

a) the art of thinking about your thinking while your'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

UNCRITICAL THINKING

a) thought captive of one's ego, desires, social conditioning, prejudices, or irrational impressions

b) thinking that is egocentric, careless, heedless of assumptions, relevant evidence, implications, or consistency

c) thinking that habitually ignores epistemological demands in favor of its egocentric commitments

SOPHISTIC CRITICAL THINKING

a) thinking which meets epistemological demands insofar as they square with the vested interests of the thinker

b) skilled thinking that is heedless of assumptions, relevance, reasons, evidence, implications and consistency only insofar as it is in the vested interest of the thinker to do so

c) skilled thinking that is motivated by vested interest, egocentrism, or ethnocentrism rather than by truth or objective reasonability

FAIRMINDED CRITICAL THINKING

a) skilled thinking which meets epistemological demands regardless of the vested interests or ideological commitments of the thinker

b) skilled thinking characterized by empathy into diverse opposing points of view and devotion to truth as against self-interest

c) skilled thinking that is consistent in the application of intellectual standards, holding one's self to the same rigorous standards of evidence and proof to which one hold's one's antagonists

d) skilled thinking that demonstrates the commitment to entertain all viewpoints sympathetically and to assess them with the same intellectual standards, without reference to one's own feelings or vested interests, or the feelings or vested interests of one's friends, community or nation

It is important not only to emphasize the dimension of skills in critical thinking, but also to explicitly mark out the very real possibility of a one-sided use of them. Indeed, the historical tendency for skills of thought to be

systematically used in defense of the vested interests of dominant social groups and the parallel tendency of all social groups to develop one-sided thinking in support of their own interests, mandates marking this tendency explicitly. We should clearly recognize that one-sided critical thinking is much more common than fairminded critical thought.

With these cautionary remarks in mind I will provide a definition of critical thinking which lends itself to an analysis of three crucial dimensions of critical thought:

1) the perfections of thought
2) the elements of thought
3) the domains of thought

THE DEFINITION:

> Critical thinking is disciplined, self-directed thinking which exemplifies the perfections of thinking appropriate to a particular mode or domain of thinking. It comes in two forms. If the thinking is disciplined to serve the interests of a particular individual or group, to the exclusion of other relevant persons and groups, I call it *sophistic* or *weak sense* critical thinking. If the thinking is disciplined to take into account the interests of diverse persons or groups, I call it *fairminded* or *strong sense* critical thinking.

To this definition should be added the following gloss:

> In thinking critically we use our command of *the elements of thinking* to adjust our thinking successfully to the logical demands of a type or *mode of thinking*. As we come to habitually think critically in the strong sense we develop special *traits of mind*: intellectual humility, intellectual courage, intellectual perseverance, intellectual integrity, and confidence in reason. A sophistic or weak sense critical thinker develops these traits only in a restricted way, consistent with egocentric and sociocentric commitments.

I shall now list examples of what I mean by the perfections and imperfections of thought, the elements of thought, and the domains of thought. In each case I will comment briefly on the significance of these dimensions.

The Perfections and Imperfections of Thought

clarity _____ vs _____ unclarity
precision _____ vs _____ imprecision
specificity _____ vs _____ vagueness
accuracy _____ vs _____ inaccuracy
relevance _____ vs _____ irrelevance
consistency _____ vs _____ inconsistency
logicalness _____ vs _____ illogicalness
depth _____ vs _____ superficiality
completeness _____ vs _____ incompleteness
significance _____ vs _____ triviality
fairness _____ vs _____ bias or one-sidedness
adequacy (for purpose) _____ vs _____ inadequacy

Each of the above are general canons for thought. To develop one's mind and to discipline one's thinking to come up to these standards requires extensive practice and long-term cultivation. Of course coming up to these standards is relative and often has to be adjusted to a particular domain of thought. Being *precise* while doing mathematics is not the same thing as being precise while writing a poem or describing an experience.

Furthermore, one perfection of thought may come to be periodically incompatible with the others: *adequacy to the purpose.* Because the social world is often irrational and unjust, because people are often manipulated to act against their interests, because skilled thought is often used to serve vested interest, thought adequate to these purposes may require skilled violation of the common standards for good thinking. Skilled propaganda, skilled political debate, skilled defense of a group's interests, skilled deception of one's enemy may require the violation or selective application of any of the above standards. The perfecting of one's thought as an instrument for success in a world based on power and advantage is a different matter from the perfecting of one's thought for the apprehension and defense of fairminded truth. To develop one's critical thinking skills merely to the level of adequacy for success is to develop those skills in a lower or *weaker* sense. It is important to underscore the commonality of this weaker sense of critical thinking, for it is dominant in the everyday world. Virtually all social groups disapprove of members who make the case for their competitors or enemies however justified that case may be. Skillful thinking is commonly a tool in the struggle for power and advantage, not an angelic force that transcends this struggle. It is only as the struggle becomes mutually destructive and it comes to be the advantage of all to go beyond the onesidedness of each that a social ground is laid for fairmindedness of thought. There is no society yet in existence that in a general way cultivates fairness of thought in its citizens.

The Elements of Thought

Both sophistic and fairminded critical thinkers are skilled compared to uncritical thinkers. The uncritical thinker is often unclear, imprecise, vague, illogical, unreflective, superficial, inconsistent, inaccurate, or trivial. To avoid these imperfections in thought requires some command of the elements of thought. These include an understanding of and an ability to formulate, analyze and assess these elements: .

1) The problem or question at issue
2) The purpose or goal of the thinking
3) The frame of reference or points of view involved
4) Assumptions made
5) Central concepts and ideas involved
6) Principles or theories used
7) Evidence, data, or reasons advanced
8) Interpretations and claims made
9) Inferences, reasoning, and lines of formulated thought
10) Implications and consequences involved

The principles of thought that underlie command of these elements may be formulated and grouped in a variety of ways. I favor a formulation that highlights the intimate relation between the component skills of critical thinking with the *traits* of a critical thinker. These abilities to command the elements of thought must be reflected in the critical thinkers' insights into the diverse demands of differing question types and domains of thought.

THE DOMAINS OF THOUGHT

The ability to command the elements of thought to achieve the perfections of thought depends on a thinker's ability to adjust his or her thinking to differing question types and domains of thought. Of course there is no *one* way to classify questions into types or thinking into domains. In fact, critical thinkers must be comfortable adjusting their thinking not only to different question types, but also to conceptualizing each question from various analytic points of view. Often one should understand a question from a "subject-matter" point of view: to grasp, for example, that it is biological, or psychological, or mathematical, or economic. But this is rarely enough, for the same subject area may contain questions of different types, may have more than one conceptual framework within it, and many of the most important questions we face are multi-disciplinary or interdisciplinary in nature. Or one question may be analyzed from different perspectives within the logic of questions. For example, virtually all questions can be analyzed from the perspective of the distinction between empirical, conceptual, and evaluative components. Some questions are more empirical than conceptual or more evaluative than empirical. Sometimes we need to adjust our thinking about a question to take these parameters into account. Few students, for example, can address fundamentally conceptual questions; for example, questions like these:

Is a whale a fish?
Is a human fetus a person?
Is Communism compatible with democracy?
Is Capitalism compatible with democracy?
Can one ever be certain about what is right?
Are humans essentially rational or irrational?
What is the difference between freedom fighters and terrorists?
Are there such things as male and female qualities or are all such qualities a matter of social conditioning?
Can computers think?
Do animals have language?

And this is by no means all, for sometimes one must know whether a question is being raised against the background of a given social system, a given socio-logic. I have alluded to this variable before in terms of the use within social systems of "functional falsehoods". What is justified as an answer to a question, given one social system as the defining context, may very well be different within the logic of another social system. We need to

know, therefore, whether we must reason within the logic of a given social system or more broadly. A question may be answerable within one system and not within another, or not in the same sense, or in the same sense but with a different answer.

Going still further, one may have to recognize, in asking a question, whether we are framing it within the logic of a technical or natural language. The question, "What is fear?" asked with the technical language of physiology and biology in mind, may well be a different question from that same interrogative sentence asked in ordinary English, a *natural* language.

Finally we often need to know, when reasoning about a question, whether it is most appropriately treated within an established logic (monological issues), or whether it is plausible to approach it from diverse points of view (multilogical issues). If one dominant theory or established procedure or algorithm exists for settling a question, it is rational to use it. Many of the routine problems of everyday life as well as many of the standard problems in highly technical or scientific disciplines are of this sort. However, students must learn how to identify those higher order problems to which multiple theories, frames of reference, or competing ideologies apply, and hence which cannot legitimately be approached monologically. Instruction rarely addresses these multilogical issues, even though most of the pressing problems of everyday social, political, and personal life are of this kind. Moreover, there is good reason to use a multilogical approach even to monological issues, when students initially approach them. I shall return to this important point presently.

Schooling, as structured today, lacks *organized* emphasis on any of these dimensions of thought: its perfections, its elements, or its typology. Educators assume good thinking follows from the systematic coverage of content and problem-solving algorithms and the memorization that traditional didactic instruction inevitably fosters. The result is students who do not think about the general perfections, the elements, or the typology of thought, students who think about knowledge and learning solely within the traditional didactic model and, as a result, can function comfortably only with lower-order, monological problems. As Lauren Resnick has put it:

> Mass education was, from its inception, concerned with inculcating routine abilities: simple computation, reading predictable texts, reciting religious or civic codes. It did not take as goals for its students the ability to interpret unfamiliar texts, create material others would want and need to read, construct convincing arguments, develop original solutions to technical or social problems. The political conditions under which mass education developed encouraged instead the routinization of basic skills as well as the standardization of teaching and education institutions. (p. 5)

Resnick characterizes the kind of (higher order) thinking typically neglected in the schools as follows:

- Higher order thinking is *nonalgorithmic*. That is, the path of action is not fully specified in advance.

- Higher order thinking tends to be *complex.* The total path is not "visible" (mentally speaking) from any single vantage point.
- Higher order thinking often yields *multiple solutions,* each with costs and benefits, rather than unique solutions.
- Higher order thinking involves *nuanced judgment* and interpretation.
- Higher order thinking involves the application of *multiple criteria,* which sometimes conflict with one another.
- Higher order thinking often involves *uncertainty.* Not everything that bears on the task at hand is known.
- Higher order thinking involves *self-regulation* of the thinking process. We do not recognize higher order thinking in an individual when someone else calls the plays at every step.
- Higher order thinking involves *imposing meaning,* finding structure in apparent disorder.
- Higher order thinking is *effortful.* There is considerable mental work involved in the kinds of elaborations and judgments required. (p. 3)

Important consequences follow from this tendency of schools to emphasize lower order thinking: *1)* students do not learn how to think in an interdisciplinary way, *2)* they are uncomfortable thinking within multiple points of view, *3)* they tend to look for recipes and algorithmic procedures for settling questions, *4)* they tend to do poorly when faced with unfamiliar issues, and *5)* they tend to gravitate toward an uncritical dogmatism or an equally uncritical relativism. Not only do most students fail to achieve any sense of how to adjust their thinking to the nature of the issue or domain about which they are thinking, but their spontaneous "lower order" thinking prevents them from developing into autonomous thinkers and independent learners.

✦ *The Logic of Learning Versus the Logic of Proof*

Higher order (multilogical) thinking applies to two basic conditions: *1)* when the question at issue is multilogical and *2)* when one is unfamiliar with the logic of the question at issue and hence must think one's way into its background logic. Standard instruction is ill-suited to both of these conditions. Multilogical issues are usually ignored and monological domains are presented as finished products. Students seldom have an opportunity to think their way into a new domain of knowledge, but are instead expected to learn to think within finished procedures, algorithms, or concepts. Most mathematics instruction illustrates this point. Rather than being introduced to problems that bridge the gap between familiar and novel problem types, students are introduced to finished algorithms and procedures. Consequently most students have large gaps in their thinking, since the algorithms they learn are only superficially understood. They are rarely expected to *think* their way to these algorithms. They learn to identify the need for one by recognizing the form in which problems are (artificially) framed in their texts.

History instruction illustrates a parallel point. Students read the finished products of professional historians rather than problems and data which enable them to think historically. Students have little sense of how to engage in historical thinking and so do not recognize the historical dimension of the problems they face in everyday life. What they learn in history class seems totally unrelated to their concerns or values.

We need a shift to higher-order thinking in every domain of learning: in monological domains like mathematics, so that students *think* their way non-algorithmically into mathematical systems, and in multilogical domains like history and sociology so that they come to appreciate the true (multilogical) nature of these domains.

The main point is this, higher-order thinking is required for all deep-seated original learning, even within domains that, once mastered, can routinely be canvassed in a lower order, monological way. To genuinely grasp a new logical domain, one must thoughtfully transfer logical structures that one does understand to the new domain and use the familiar logic analogically to mentally construct the unfamiliar one. This requires higher order thinking on the part of all learners in all original learning. It requires argumentation pro and con as students explore alternative analogies and strategies. Standard schooling has yet to assimilate this insight.

A couple of examples from research into math and science instruction will illustrate this point. Math and science provide paradigms of monological disciplines. Algorithms and quantifiable laws abound. Most textbooks contain no theoretical disputes. Students are mainly expected to learn established procedures, technical definitions, and practices. Yet even here we are discovering the importance of having students *think* their way, on their own terms, with much theoretical disputation, to comprehension and insight. The work of Easley at Illinois (1983a, 1983b, 1984a, 1984b) Schoenfeld at Berkeley, (1979, 1985, 1986, 1987, in press), and many others [Collins, Brown, and Newman (in press), Crosswhite (1987), Kilpatrick (1987), Driver (1978, 1986, 1987), Smith (1987b, 1987a, 1983), and Roth (1984, 1986, 1987)] demonstrate this need.

Schoenfeld puts the claim bluntly: "I believe that most instruction in mathematics is, in a very real sense, deceptive and possibly fraudulent." He supports this claim by citing cases in which it can be demonstrated that even advanced students of mathematics have fundamental misconceptions about the mathematical symbols and algorithms they manipulate:

> I taught a problem-solving course for junior and senior mathematics majors at Berkeley in 1976. These students had already seen some remarkably sophisticated mathematics. Linear algebra and differential equations were old hat. Topology, Fourier transforms, and measure theory were familiar to some. I gave them a straightforward theorem from plane geometry (required when I was in the tenth grade). Only two of eight students made any progress on it, some of them by using arc length integrals to measure the circumference of a circle. (Schoenfeld, 1979) Out of the context of normal course work these students could not do elementary mathematics. (pp. 28–29)

> In sum, all too often we focus on a narrow collection of well-defined tasks and train students to execute those tasks in a routine, if not algorithmic fashion. Then we test the students on tasks that are very close to the ones they have been taught. If they succeed on those problems we and they congratulate each other on the fact that they have learned some powerful mathematical techniques. In fact, they may be able to use such techniques mechanically while lacking some rudimentary thinking skills. To allow them and ourselves, to believe that they "understand" the mathematics is deceptive and fraudulent. (p. 29)

Schoenfeld compares stereotypical standard practice with multilogical mathematics instruction that focuses on class discussion, debate, argumentation, and interdisciplinary application. He cites Harold Fawcett's geometry classes at the Ohio state University laboratory school, described in the 1938 NCTM Yearbook, *The Nature of Proof:*

> Simply put, Fawcett believed that mathematics can help you think — in particular, that a course in geometric proof can help students to learn to reason clearly about a wide range of situations. Following Dewey, Fawcett hoped to help his students develop "reflective thinking" — "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends". Following Christofferson, Fawcett sought to develop in his students "an attitude of mind which tends always to analyze situations, to understand their interrelationships, to question hasty conclusions, to express clearly, precisely, and accurately non-geometric as well as geometric ideas". Among his goals for students were that in situations sufficiently important to them, his students would: ask that important terms be defined; require evidence in support of conclusions they are pressed to accept; analyze the evidence and distinguish fact from assumption; recognize stated and unstated assumptions; evaluate them; and finally, evaluate the arguments, accepting or rejecting the conclusion. Moreover, they would do so reflectively, constantly re-examining the assumptions behind their beliefs and that guide their actions. (p. 37–8 Schoenfeld)

Katherine Roth (in press) comments on the problem of science instruction in a similar way:

> Students memorize facts and formulae, they plug in these facts and formulae to pass tests, and they use these to solve "textbook" problems. However, they do not use these facts and formulae to explain real-world phenomena that they observe and experience. To students, the facts and formulae are school knowledge, perhaps a third vine to add to the Pines and West (1983) metaphor. Students use this vine of knowledge to "get by" in school. However, this vine is unconnected with really making sense of their disciplinary vine, and it is totally irrelevant to students' everyday ways of thinking — their intuitive knowledge vine. Thus, students end instruction still finding their intuitive theories, or misconceptions, as most useful in explaining their world. Connections between their own understandings and the disciplinary concepts are rarely made. (p. 23)

She and others doing similar research continually call for an approach that requires much classroom "debate" and hence multilogical thinking:

> Most of the teachers using conceptual conflict as an instruction strategy frequently encouraged students to debate among themselves. They did not easily cave in to students' desires to be told the "right" answer. Instead, the teachers asked questions to help students clarify their explanations and to develop better support for their thinking. (ibid)

We should not assume, of course, that the change required is simply in a manner of teaching on the part of the teacher. It also requires a fundamental change in the teachers' thinking about their own learning. Consider this letter from a teacher with a Master's degree in physics and mathematics, with 20 years of high school teaching experience in physics:

> After I started teaching, I realized that I had learned physics by rote and that I really did not understand all I knew about physics. My thinking students asked me questions for which I always had the standard textbook answers, but for the first time it made me start thinking for myself, and I realized that these canned answers were not justified by my own thinking and only confused my students who were showing some ability to think for themselves. To achieve my academic goals I had to memorize the thoughts of others, but I had never learned or been encouraged to learn to think for myself.

✦ *Conclusion*

The pace of change in the world is accelerating, yet educational institutions have not kept up. Indeed, schools have historically been the most static of social institutions, uncritically passing down from generation to generation out-moded didactic, lecture-and-drill-based, models of instruction. Predictable results follow. Students, on the whole, do not learn how to work by, or think for, themselves. They do not learn how to gather, analyze, synthesize, and assess information. They do not learn how to analyze the diverse logics of the questions and problems they face and hence how to adjust their thinking to them. They do not learn how to enter sympathetically into the thinking of others, nor how to deal rationally with conflicting points of view. They do not learn to become critical readers, writers, speakers, or listeners. They do not learn how to use their native languages clearly, precisely, or persuasively. They do not, therefore, become "literate", in the proper sense of the word. Neither do they gain much genuine knowledge since, for the most part, they could not explain the basis for their beliefs. They would be hard pressed to explain, for example, which of their beliefs were based on rational assent and which on simple conformity to what they have heard. They do not see how they might critically analyze their own experience or identify national or group bias in their own thought. They are much more apt to learn on the basis of irrational than rational modes of thought. They lack the traits of mind of a genuinely educated person: intellectual humility, courage, integrity, perseverance, and faith in reason.

Fortunately, there is a movement in education today striving to address these problems in a global way, with strategies and materials for the modification of instruction at all levels of education. It arises from an emerging new theory of knowledge, learning, and literacy which recognizes the centrality of independent critical thought to all substantial learning, which recognizes the importance of higher order multilogical thinking for childhood as well as adult learning, to foundational learning in monological as well as multilogical disciplines. This educational reform movement does not propose an educational miracle cure, for its leading proponents recognize that many social and historical forces must come together before the ideals of the critical thinking movement will be achieved. Schools do not exist in a social vacuum. To the extent that the broader society is uncritical, so, on the whole, will society's schools. Nevertheless the social conditions necessary for fundamental changes in schooling are increasingly apparent. The pressure for fundamental change is growing. Whether and to what extent these needed basic changes will be delayed or side-tracked, and so require new periodic resurgences of this movement, with new, more elaborate articulations of its ideals, goals, and methods — only time will tell.

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