

Excerpts from:

Critical Thinking:

What Every Person Needs to Survive in a Rapidly Changing World

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CHAPTER 4: **Critical Thinking: What, Why, and How** [45-56]

The Logically Illogical Animal

Ironically, humans are not simply the only “logical” animal, they are also the only “illogical” animal. They are the only animal that uses meanings—ideas, concepts, analogies, metaphors, models, theories, and explanations—to make sense of things, to understand, predict, and control things. They are also the only animal that uses meanings to negate, contradict, and deceive itself, to misconceive, distort, and stereotype, to become dogmatic, prejudiced and narrow-minded. Humans are the only animal whose thinking can be characterized in terms like clear, precise, accurate, relevant, consistent, profound, and fair; they are also the only animal whose thinking is often imprecise, vague, inaccurate, irrelevant, superficial, trivial, and biased. Critical thinking makes sense in light of this paradoxical dichotomy. Humans shouldn't simply trust their instincts. They shouldn't unquestioningly believe what spontaneously occurs to them. They shouldn't accept as true everything taught as true. They shouldn't assume their experience is unbiased. They need to form, they are not born with, intellectually sound standards for belief, for truth, for validity. They need to cultivate habits and traits which integrate these standards into their lives.

This logical-illogical dichotomy of human nature has implications for human learning. One can learn through the rational capacities of the human mind or through its irrational propensities. There are profound reasons for cultivating the capacity of the human mind to discipline and direct its thought through commitment to intellectual standards. Unfortunately much academic learning is of a lower order: undisciplined, associative, and inert. Much of it is an obstacle rather than an aid to education. Much of it blocks genuine understanding.

What students often learn well—that school is a place to repeat back what the teacher or textbook said and to follow the correct steps in the correct order to get the correct answer—blocks them from thinking seriously about what they learn. Though there are circumstances in everyday life where lower order rote learning is sufficient, those circumstances are diminishing rapidly. At the same time the damage done by multiple forms of prejudice and narrow-mindedness—academic, social, personal, professional, religious, racial, national, and ideological—continues to mount. The irony is that higher order learning can be cultivated in almost any academic setting. By focusing on the rational capacities of students' minds, by designing instruction so that students explicitly grasp the sense, the logicalness, of what they learn, we can make all additional learning easier for them. Higher order learning multiplies comprehension and insight; lower order rote memorization multiplies misunderstanding and prejudice. Higher order learning stimulates and empowers, lower order discourages and limits the learner. Though very little instruction deliberately aims at lower order learning, most issues in it. “Good” students have developed techniques for short term rote memorization and performance; “poor” students have none. But few students understand what it means to think through the content of a subject analytically, few use critical thinking as a tool for acquiring knowledge.

Didactic lectures, extensive coverage of content, and mindless drill combine with student passivity to perpetuate the lower order thinking and learning students have come to associate with school. When students do not actively think their way to conclusions, when they do not discuss their thinking with other students or the professor, when they do not entertain a variety of points of view, analyze concepts, theories, or explanations from their own points of view, actively question the meaning and implications of what they learn, compare what they learn to their experiences, tackle non-routine problems, examine assumptions, or gather evidence, they do not achieve higher order learning. They end their schooling with a jumble of fragmentary opinions, rigidly understood procedures, and undisciplined beliefs. They gain little knowledge or insight. They are at best trained, not educated, not critical thinkers or persons. As a result, their adaptability, their capacity to learn on the job and in their personal and civic lives, is severely limited. Their ability to mature intellectually and morally, their capacity and motivation to learn, is stunted.

Recognition of the social, political and moral implications of lower order learning is growing with the recognition that both developed and underdeveloped nations face complex problems that cannot be solved except with significant intellectual growth on the part of large masses of people. Such growth presupposes 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.

This problem of lower order learning will not be solved outside of school, for the lay person is increasingly bombarded with diverse contradictory explanations and prescriptions. Lacking experience with complex thinking, unused to critical thinking, the ordinary person retreats in the face of complexity to simplistic pictures of the world. The growing mass media feed this demand for simple-minded answers, politicians cater to it. If schools and colleges do not cultivate a shift from rote memorization to critical thinking, there is little possibility that the shift will significantly occur outside of school.

To effect this shift, teachers and professors must consider a new concept of knowledge, learning, and literacy, one more realistic and in tune with the modern world, one that links the acquisition of knowledge with dialogical and dialectical thinking, with the development of minds at home with complexity and ambiguity, able to adjust their thinking to accelerating changes, not fixated on present beliefs, not easily manipulated or taken in by propaganda. (Scriven 1985) The theoretical foundation for this need and the appropriate way to meet it is now accumulating a solid research base. Its academic implementation is merely beginning; its full development around the world is probably 10 to 25 years in the future.

Knowledge as Thinking

We often talk of knowledge as though it could be divorced from thinking, as though it could be gathered up by one person and given to another in the form of a collection of sentences. When we talk in this way we forget that knowledge, by its very nature, depends on thought. Knowledge is produced by thought, analyzed by thought, comprehended by thought, organized, evaluated, maintained, and transformed by thought. Knowledge exists, properly speaking, only in minds that have comprehended and justified it through thought. And when we say think we mean think critically. Knowledge should not be confused with belief or with symbolic representation of belief. Humans can easily believe things that are false or believe things to be true without knowing them to be so. A book contains knowledge only in a derivative sense, only because minds can thoughtfully read it and through that process gain knowledge. We often forget this and design instruction as though recall were equivalent to knowledge.

We need to remember that all knowledge exists in and through critical thought. All the disciplines—mathematics, physics, chemistry, biology, geography, sociology, anthropology, history, philosophy, and so on—are

modes of thought. We know mathematics, not to the extent that we can recite mathematical formulas, but only to the extent that we can think mathematically. We know science, not to the extent that we can recall sentences from our science textbooks, but only to the extent that we can think scientifically. We understand sociology only to the extent that we can think sociologically, history only to the extent that we can think historically, and philosophy only to the extent that we can think philosophically.

When we teach each subject in such a way that students pass courses without thinking their way into the knowledge that these subjects make possible, students leave those courses without any more knowledge than they had when they entered them. When we sacrifice thought to gain coverage, we sacrifice knowledge at the same time. The issue is not shall we sacrifice knowledge to spend time on thought, but shall we continue to sacrifice both knowledge and thought for the mere appearance of learning, for mislearning, for fragmentary learning, for transitory learning, for inert, confused learning?

Lower-Order Learning

There are a variety of forms of lower order learning in the schools. We can understand the forms by understanding the relative lack of logic informing them. Paradigmatically, lower order learning is learning by sheer association or rote. Hence students come to think of history class, for example, as a place where you hear names and dates and places; where you try to remember them and state them on tests. Math comes to be thought of as numbers, symbols, and formulas, mysterious things you mechanically manipulate as the teacher told you to get the right answer. Literature is often thought of as uninteresting stories to remember along with what the teacher said is important about them.

Schoenfeld has demonstrated that lower order learning dominates schooling, even in mathematics classes which often pass for paradigms of disciplined thought-filled learning. However, most students are so far from thinking mathematically, most math instruction so ineffective in achieving that end, that Schoenfeld concludes: "... most instruction in mathematics is, in a very real sense, deceptive and possibly fraudulent". (Schoenfeld, 1982) He elaborates as follows:

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

Richard Paul (1990)

thinking skills. To allow them, and ourselves, to believe that they "understand" the mathematics is deceptive and fraudulent. (p. 29)

Schoenfeld cites a number of studies to justify this characterization of math instruction and its lower order consequences. He also gives a number of striking examples, of which I will repeat but one:

At the University of Rochester 85 percent of the freshman class takes calculus, and many go on. Roughly half of our students see calculus as their last mathematics course. Most of these students will never apply calculus in any meaningful way (if at all) in their studies, or in their lives. They complete their studies with the impression that they know some very sophisticated and high-powered mathematics. They can find the maxima of complicated functions, determine exponential decay, compute the volumes of surfaces of revolution, and so on. But the fact is that these students know barely anything at all. The only reason they can perform with any degree of competency on their final exams is that the problems on the exams are nearly carbon copies of problems they have seen before; the students are not being asked to think, but merely to apply well-rehearsed schemata for specific kinds of tasks. Tim Keifer and I studied students abilities to deal with pre-calculus versions of elementary word problems such as the following:

An 8-foot fence is located 3feet from a building. Express the length L of the ladder which may be leaned against the building and just touch the top of the fence as a function of the distance X between the foot of the ladder and the base of the building.

We were not surprised to discover that only 19 of 120 attempts at such problems (four each for 30 students) yielded correct answers, or that only 65 attempts produced answers of any kind. (p. 28)

The result is that students leave with a jumble of undigested fragments left over after they have forgotten most of what they had to cram into their short-term memory for particular tests. They rarely grasp the logic of what they learn. Rarely do they relate what they learn to their own experience and critique each by means of the other. Rarely do they try to test what they learn in everyday life. Rarely do they ask "Why is this so? How does this relate to what I already learned? How does this relate to what I am learning in other classes?" To put the point in a nutshell, very few students know what it means to rationally organize what they learn.

Consider, for example, the manner in which students relate to their native language. If one questions them about the meanings of words, their account is typically incoherent. They often say that everyone has their own meaning for all the words they use, not noticing that were this true we would not be able to understand each other.

Students speak and write vaguely because they have no criteria for choosing words; they merely write what pops into their heads. They do not

3 of 25

realize that every language has a highly refined logic which one must learn to express oneself precisely. They do not realize that even words similar in meaning typically have different implications.

Consider, for example, the words explain, expound, explicate, elucidate, interpret, and construe. Explain implies the process of making clear and intelligible something not understood or known. Expound implies a systematic and thorough explanation often by an expert. Explicate implies a scholarly analysis developed in detail. Elucidate implies a shedding of light upon by clear and specific illustration or explanation. Interpret implies the bringing out of meanings not immediately apparent. Construe implies a particular interpretation of something whose meaning is ambiguous.

I am not complaining that students do not distinguish the logic of these particular words but that they do not recognize that any words have a logic. They do not recognize that words generate implications, whether the user recognizes them or not. Not recognizing that what they say has implications, they do not recognize the responsibility to have evidence to support what their words imply. As a result, they routinely confuse believing with knowing, reasoning with rationalizing, evidence with conclusion, data with interpretation, and so on and on. Therefore, when reading, they cannot identify the evidence an author needs to justify the implications that follow from what the author said. When others speak to them, they do not recognize that the truth or falsity of their words depends on whether evidence or reasons justifies the implications of the words used.

Student failure to understand the logic of ordinary language and the intellectual discipline inherent in educated usage spills over into a failure to understand the logic of technical languages and the intellectual discipline necessary to use technical terms accurately. Students then do not understand how to weave technical concepts into discourse in everyday language.

Students fail to see that every technical term has logical relationships with other technical terms and that some terms are logically more basic than others. Consequently they do not look for seminal terms as they study an area. They do not strive to translate technical terms into analogies and ordinary words they understand. They do not look for the basic assumptions of the disciplines they study. Indeed, on the whole they do not know what assumptions are nor why it is important to examine them. What they have in their heads exists there like so many BB's in a bag. Whether one thought supports or follows from another, whether one thought elaborates another, exemplifies, presupposes, or contradicts another, are matters students have not learned to think about. They have not learned to use thought to understand thought, which is another way of saying that they have not learned to use thought to gain knowledge.

Knowledge, Intellectual Discipline, and Intellectual Values

Knowledge, I have argued, must be understood as the consequent of a perfecting discipline of thought, of learning to think critically. Take the point one step further. To perfect one's thinking, to develop intellectual discipline, one must develop intellectual values. In other words, genuine education transforms the whole person by transforming one's basic modes of thinking. Indeed, properly understood, education implies a self-motivated action upon our thinking and a participation in the forming of our character. Through it we cultivate self-directedness of thought and transform our values.

Students will not develop intellectual standards that discipline their thought if they do not grasp what intellectual standards are or understand their importance. Why be clear and precise? Why probe what you hear and read to see if you clearly understand it? Why choose the exact word to say what you mean? Why look for reasons and evidence to justify what you believe? Why not just do and think what comes naturally? Why not believe what you want to believe, what your friends believe, what is easiest to believe? Why take what happens in school seriously? Why struggle to change your mode of thinking and believing? Why strive to become an educated person?

The implication is this. If we want students to gain knowledge, we must not only shape instruction so that they must think their way through the content of the course, we must also design activities, tests, and assignments so that students think about the intellectual standards and values that underlie rational learning.

Critical thinking is not just a mode of thinking about thinking; it is also a mode of apprehending and assenting to standards and values inherent in educated thought. Learning to think in any discipline is learning to discipline one's thought by standards inseparable from values presupposed in each discipline. Every discipline is to some extent unique, but also overlaps with other disciplines, presupposes modes of thought outside itself, is ultimately translatable into everyday language, and generates knowledge consistent with that generated by other disciplines as well as with everyday modes of knowing. Among other things, education is learning to correct and qualify what we learn in one discipline by what we learn not only in other disciplines but in everyday life as well. What, for example, would we do with a scientific theory that implied that ice does not float on water? What would we do with a psychological theory that implied that people don't have dreams?

Correcting and qualifying one discipline by another, and all disciplines by our experience, requires a personal synthesis that rests heavily on our capacity to think critically for ourselves.

A Definition of Critical Thinking

We can now give a definition of critical thinking that helps tie together what has been said so far, a definition that highlights three crucial dimensions of critical thought: 1) the perfections of thought; 2) the elements of thought; and, 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 thought. It comes in two forms. If disciplined to serve the interests of a particular individual or group, to the exclusion of other relevant persons and groups, it is sophistic or weak sense critical thinking. If disciplined to take into account the interests of diverse persons or groups, it is fair-minded or strong sense critical thinking.

In thinking critically we use our command of the elements of thought to adjust our thinking to the logical demands of a type or mode of thought. 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 narrowly in accordance with egocentric and sociocentric commitments.

Now I shall explain what I mean by the perfections and imperfections of thought, the elements of thought, the domains of thought, and traits of mind. In each case I will comment briefly on the significance of these dimensions. I will then relate these dimensions to the process of helping students to come to terms, not only with the logic of their own thought, but with the logic of the disciplines they study, as well.

THE PERFECTIONS AND IMPERFECTIONS OF THOUGHT

clarity	vs.	unclearly
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
adequacy (for purpose)	vs.	inadequacy

Each of the above are general canons for thought; they represent legitimate concerns irrespective of the discipline or domain of thought. To develop one's mind and discipline one's thinking with respect to these standards requires extensive practice and long-term cultivation. Of course achieving these standards is a relative matter and often they have to be adjusted to a particular domain of thought. Being precise while doing mathematics is not the same as being precise while writing a poem or describing an experience. Furthermore, one perfection of thought that may be periodically incompatible with the others, and that is adequacy to 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, those whose main purpose is to forward their selfish interests, often skillfully violate the common standards for good thinking. Successful propaganda, successful political debate, successful defense of a group's interests, successful deception of one's enemy often requires the violation or selective application of many of the above standards. The perfecting of one's thought as an instrument for success in a world based on power and advantage differs from the perfecting of one's thought for the apprehension and defense of fair-minded truth. To develop one's critical thinking skills merely to the level of adequacy for social 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. Only as the struggle becomes mutually destructive and it becomes advantageous for all to go beyond the one-sidedness of each, that a social ground is laid for fair-mindedness of thought. No society yet in existence cultivates fairness of thought generally in its citizens.

THE ELEMENTS OF THOUGHT

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

- 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 which follow

Focusing on the nature and interrelationships of the elements of thought illuminates the logic of any particular instance of reasoning or of any domain of knowledge. For example, *at least one question is at issue in every instance of reasoning*. Can the student identify and precisely express those problems or questions, distinguishing the differences between them?

All human reasoning is oriented to serve some purpose or goal. Can students clearly express their purpose or goal and adjust their thinking to serve it? Can students analyze and critique their purpose or goal? Do students recognize the point of view or frame of reference in which they are thinking? Do they consider alternative points of view?

All reasoning must start somewhere and proceed in some direction. Can students identify what they are assuming or taking for granted in their reasoning? Can they follow out the implications and consequences of their reasoning? Can they identify contradictions in their thought?

All reasoning uses some ideas or concepts and not others. Can students identify and analyze the most fundamental concepts in their reasoning? Can they determine, for example, whether they are using a term in keeping with established usage or modifying that usage?

Most reasoning relies on principles or theories to make sense of what one is reasoning about. Can students identify the principles or theories they are using? Can they clarify them, question them, consider alternatives, apply them precisely?

Most reasoning is based on some experiences, evidence, or data which are interpreted and used as the basis of inferences. Can students identify the experiences, evidence, or data they are using or basing their reasoning upon? Can they identify their inferences? Can they rationally argue in favor of their inferences? Can they formulate and consider possible objections to their inferences?

Finally, as I have already emphasized, *all disciplines have a logic*. Can students discuss the logic of the disciplines they are studying? Can they identify their fundamental goals or purposes? The kind of questions they attempt to answer? Their basic concepts or ideas? Their basic assumptions? Their basic theories or principles? The sort of data, evidence, or experiences they focus upon? Whether there is fundamentally one or multiple conflicting

schools of thought within the discipline? When students cannot answer these questions about a subject field, they cannot think critically within it. They have no idea how to begin to compare one field to any other, nor therefore how to correct or qualify the results of one field in light of the results of another.

Traits of Mind

There are, I believe, at least seven interdependent traits of mind we need to cultivate if we want students to become critical thinkers in the strong sense. They are:

- a) **Intellectual Humility:** Awareness 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 and prejudice in, and limitations of one's viewpoint.
- b) **Intellectual Courage:** The willingness to face and assess fairly ideas, beliefs, or viewpoints to which we have not given a serious hearing, regardless of our strong negative reactions to them.
- c) **Intellectual Empathy:** Recognizing the need to imaginatively put oneself in the place of others to genuinely understand them.
- d) **Intellectual Good Faith (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.
- e) **Intellectual Perseverance:** Willingness to pursue intellectual insights and truths despite difficulties, obstacles, and frustrations.
- f) **Faith in Reason:** Confidence that in the long run one's own higher interests and those of humankind at large will be served best by giving the freest play to reason, by encouraging people to come to their own conclusions by developing their own rational faculties.
- g) **Intellectual Sense of Justice:** Willingness 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.

These intellectual traits are interdependent. Each is best developed while developing the others as well. Consider intellectual humility. To become aware of the limits of our knowledge, we need the courage to face our own prejudices and ignorance. To discover our own prejudices, we must empathize with and reason within points of view we are hostile toward. To do so, we must typically persevere over a period of time, for reasoning within a point of view against which we are biased is difficult. We will not make that effort unless we have the faith in reason to believe we will not be deceived by

whatever is false or misleading in the opposing viewpoint, and an intellectual sense of justice. We must recognize an intellectual responsibility to be fair to views we oppose. We must feel obliged to hear them in their strongest form to ensure that we are not condemning them out of ignorance or bias on our part. At this point we come full circle back to where we began: the need for intellectual humility.

These traits are applicable to all domains or modes of knowledge, not merely to some. Like the perfections and elements of thought, with which they are intimately intertwined, they are universally relevant. Of course, those reasoning to achieve selfish ends often betray intellectual standards to gain success. Schooling today neglects this deep-seated problem of selfish thought. Though most students enter and leave school as essentially uncritical thinkers, some develop a range of critical thinking skills to advance selfish ends. Yet the difference between selfish and fair-minded thought rarely becomes a significant issue in instruction. Before I go further, therefore, I should say something more about the nature of selfish thought.

Selfish Critical Thinking, Prejudice, and Human Desire

Human action is grounded in human motives and human motives are typically grounded in human desire and perceived interest. Getting what we want and what advances our prestige, wealth, and power naturally structures and shapes how we understand the situations and circumstances of our daily lives. We routinely categorize, make assumptions, interpret, and infer from within a viewpoint we use to advance our personal ends and desires. We are, in a word, naturally prejudiced in our own favor. We reflexively and spontaneously gravitate to the slant on things that justifies or gratifies our desires. It is not enough to be taught to be ethical, honest, kind, generous, thoughtful, concerned with others, and respectful of human rights. The human mind easily construes situations so it can conceive of selfish desire as self-defense, cruelty as discipline, domination as love, intolerance as conviction, evil as good.

The mere conscious will to do good does not remove prejudices which shape our perceptions or eliminate the on-going drive to form them. To minimize our egocentric drives, we must develop critical thinking in a special direction. We need, not only intellectual skills, but intellectual character as well. Indeed we must develop and refine our intellectual skills as we develop and refine our intellectual character, to embed the skills in our character and shape our character through the skills.

People not only can, but often do create the illusion of moral character in a variety of ways. For instance we systematically confuse group mores with universal moral standards. When people act in accordance with

the injunctions and taboos of their groups they naturally feel righteous. They receive much praise in moral terms. They may even be treated as moral leaders, if they act in a striking or moving fashion. For this reason, people often cannot distinguish moral from religious conformity or demagoguery from genuine moral integrity.

Genuine moral integrity requires intellectual character, for bona fide moral decisions require thoughtful discrimination between what is ethically justified and what is merely socially approved. Group norms are typically articulated in the language of morality and a socialized person inwardly experiences shame or guilt for violating a social taboo. In other words, what we often take to be the inner voice of conscience is merely the internalized voice of social authority—the voice of our mother and father, our teachers and other “superiors” speaking within us.

Another common way we systematically create the illusion of morality is egocentrically structured self-deception, the shaping and justification of self-serving perceptions and viewpoints. When engaged in such spontaneous thought we systematically confuse our viewpoint with reality itself. We do not experience ourselves as selecting among a range of possible perceptions; quite the contrary, it seems to us that we are simply observing things as they are. What is really egocentric intellectual arrogance we experience as righteous moral judgment. This leads us to see those who disagree with us as fools, dissemblers, or worse.

Since our inner voice tells us our motives are pure and we see things as they really are, those who set themselves against us, or threaten to impede our plans, seem the manifestation of evil. If they use violence to advance their ends, we experience their action as aggressive, as blind to human rights and simple justice. But if we use it, it is justifiable self-defense, restoring law and order, protecting right and justice.

Self-announced prejudice almost never exists. Prejudice almost always exists in obscured, rationalized, socially validated, functional forms. It enables people to sleep peacefully at night even while flagrantly abusing the rights of others. It enables people to get more of what they want, or to get it more easily. It is often sanctioned with a superabundance of pomp and ceremony. It often appears as the very will of God. Unless we recognize these powerful tendencies toward selfish thought, in our social institutions, in what appear to be lofty actions, we will not face squarely the problem of education.

Education, properly conceived, cultivates knowledge through higher order thinking, a process which simultaneously cultivates traits of mind intrinsic to the standards and values presupposed by fair-mindedness. Unless we take the tendency toward selfish thinking seriously, we are apt to contribute to students' critical thinking only in the narrow-minded sense.

CHAPTER 11: **Critical Thinking and Bias** [170-5]

Perhaps the most immediate and frequent problem one encounters in the practical application of the concept of bias is its reciprocal employment in areas of controversy by disputing sides against each other. When people disagree, each side frequently sees the other as unresponsive to the evidence due to antecedent commitment and so on—in other words, as “biased”. Interestingly, one of the most instructive things one can do in such circumstances is simply to point this out. First of all, this observation, especially when the problem is manifest, should produce recognition on all sides that things are seldom as clear and obvious as had originally been thought, particularly with regard to who is biased. Such recognition will frequently prove baffling and frustrating, especially with regard to the original issue, but the alert instructor may seize upon this as a golden opportunity to introduce helpful distinctions, such as Scriven's, mentioned above.

Students will often seek a way out of the frustration and bafflement in some form of epistemological relativism, and in so doing, abandon pursuit of the truth. This also presents a golden opportunity and, not incidentally, a significant pedagogical challenge. The introduction of relativism into the discussion, particularly insofar as it calls the search for truth into question, presents an opportunity to introduce helpful distinctions in basic epistemology, such as between relativism and fallibilism, and between varieties of relativism. The challenge is to restore confidence in the search for truth, without at the same time discouraging any genuine insight, for example into the finitude of individual and even collective human comprehension, which may be motivating the move to relativism.

Perhaps most important of all is the opening that such recognition makes for an exploration of a cluster of important questions as to the nature of bias, its relation to relativism, the search for truth, and so on.

One way to approach these questions would be to produce a rough taxonomy of bias, paying attention to the sources, mechanisms, and appropriate safeguards against bias. Suppose we begin by distinguishing two broad categories of bias. One category is suggested in the expression, “His bias is that of a cognitive psychologist,” or, “His bias is that he holds a cyclical view of history,” or, “his bias is that he is approaching this from a psychoanalytical point of view.” Most subjects worth discussing can be approached from within the frameworks of distinct disciplines of study and competing “schools of thought,” which differ significantly about how to conceptualize problems, interpret data, and so on. One's orientation within a discipline or commitment to a school of thought can make one occasionally, or even systematically, blind to relevant features of a situation, alternative

ways of conceptualizing or approaching a problem, interpreting data, and can do so in remarkably subtle ways of which one may not be fully aware. As against this, let us also consider a more mundane, but equally broad category of bias, which can be traced more directly to human irrationality.

In a sense, people are animals whose minds are in some ways tailor-made for close-mindedness and hence for bias. However we are raised, we develop a certain number of fears, we experience desires, we gain vested interests, we build friendships, we have allegiances, and so on, each of which can become a possible source of bias in us, insofar as each can affect what we are prepared to consider, how seriously we are prepared to consider it, and so on. A desire to get what one wants often produces a bias against the rights and needs of others. Fear can produce bias, because when one is under the sway of fear, it is harder to think clearly about the source of that fear. If one belongs to a group which rewards orthodoxy or penalizes the unorthodox, one can be pressured into bias, as the natural wish to be accepted by one's friends and peer group may strongly incline one to accept what the group accepts and reject what the group rejects. In other words, a good deal of distortion and inadequacy in our thinking—a good deal of bias— can be traced to routine emotional turmoil. Unfortunately, this sort of bias can always intrude upon our thinking in ways we do not apprehend, even if we are critical thinkers and persons of good will.

It is therefore important to be aware how the development of instructional programs in reasoning, and in particular strategies for handling bias, can be affected by factors of both the above sorts. For example, consider some of the more striking differences in approach between programs in which "Thinking Skills" is the dominant descriptor and those in which "Critical Thinking" is stressed. The Thinking Skills approach tends to reflect the influence of cognitive psychology and its concerns with discrete intellectual operations, hierarchical skill levels, measurable performance, and so on, but tends also to overlook the affective dimension of personality and the obstacles to good reasoning to which it gives rise. This approach assumes, in effect, that isolating cognitive functions, and drilling and measuring them in isolation, are both possible and constitute a means perhaps of "purifying" them of affective slant.

Contrast this with the influence of the Socratic philosophical tradition reflected in the Critical Thinking movement. This approach emphasizes cultivating a certain sort of person, the "rational person", conceived of as whole and integrated and as involving affective as well as cognitive dimensions. Respect for the inter-related multi-dimensionality of personality gives rise to instructional strategies for which the metaphor of cultivation is especially apt. These involve attempts to guide a process of growth and

development understood to be original, ongoing, and authentically within the individual student. Rather than discount or ignore the affective dimension of personality this approach seeks to engage it and to coordinate its development with that of the cognitive dimension. Thus, attention to bias, as one persistent and recurrent outgrowth of the affective life of the individual becomes crucial to the critical thinking approach.

Further, since such programs aim to cultivate the individual as intellectually autonomous, they must encourage vigilance in the individual students themselves as indispensable to the establishment and maintenance of good reasoning. The variety of human personality and experience and the dynamic nature of the process of growth and development make the routinization and standardization of instruction and measurement both clumsy and exceedingly problematic. So the critical thinking approach favors interaction, individual attention, and sensitivity to nuance as preferable tools both for instruction and measurement. Hierarchically structured and centrally controlled institutions, like our public schools, however, do not accommodate this sort of thing naturally or well. So it is no surprise to find the schools subscribing much more readily and wholeheartedly to some rather crude versions and partial understandings of the former approach, in which the mind is treated as an empty container into which knowledge is put bit by bit, while very little is done to involve the student in the process as a human being— or, to use a more up to date, but equally inadequate metaphor, as though the mind were a computer into which information can be fed bit by bit as it is programmed to perform more and more complex operations (this is sometimes manifested in what is called "teaching to the test").

We must bear in mind the likelihood that some bias, particularly as to approach or framework of assumptions, is inherent in the very process of thinking itself. Experience teaches us again and again our limitations. A simple thought experiment may help in appreciating this. Take something as familiar as one's own hand, and let us try to comprehend the reality of it. What are its characteristics? Is it hard? Soft? Flexible? Warm? Graceful? Clumsy? (Compared to what?) How does it look under a microscope? Are there things going on in it of which we are unaware? (Perhaps if we knew more about molecular chemistry, neuro-physiology, ...) How much of what one knows of this hand depends upon whether one is a pianist? A surgeon? A boxer? Does our present extraordinarily close attention to it affect its behavior? Its physiological state? Very quickly it becomes apparent that the reality of the situation far outstrips even the vast accumulation of human knowledge, which far outstrips the scope of any of our individual accumulations of wisdom and experience. Even the most deliberate, flexible, open-minded and comprehensive thinker among us must recognize how minute and fragile is

one's knowledge compared with what there remains to learn, and also how profound and far-reaching is the effect of new experience, new knowledge on how one approaches and experiences things. As John Wisdom put it, with only slight exaggeration:

As we all know but won't remember, any classificatory system is a net spread on the blessed manifold of the individual and blinding us not to all but to too many of its varieties and continuities. A new system will do the same but not in just the same ways. So that in accepting all the systems their blinding power is broken, their revealing power becomes acceptable; the individual is restored to us, not isolated as before we used language, not in a box as when language mastered us, but in "creation's chorus!"

Though we are not prepared to endorse the claim implicit in Wisdom's words, that universal comprehension (an acceptance of all conceptual frameworks at once) is attainable, or the conclusion that all points of view are equally worthy, we agree that any point of view or framework of assumptions may safely be assumed limited and confining. Hence, in one sense all thinking is "biased", in other words, partial and perspectival, rather than total and complete. And this has far-reaching implications for both theory and practice, which we can only begin to explore here. Inevitably one must resign oneself, with appropriate intellectual humility, to working from within a limited range of insights, (whose limitations do not make them any the less insights — only limited ones). Therefore one must resign oneself further to resorting again and again to assumptions and provisional understandings, each of which involves selectively setting aside alternative ways of seeing things and therefore also involves a continual risk of error, and a form of ongoing and sometimes ineffable blindness.

We doubt that this sort of risk can be eliminated entirely. Rather risk and blindness are intrinsic to human thought. The attempt to think perfectly, certainly, absolutely, or to eliminate risk, blindness, and error entirely, is at least as likely to result in intellectual paralysis, or total confusion, as in a noble and sustained philosophy, though a number of noble and sustained attempts have been made in the history of philosophy. This reflects an absolutist tendency in human thinking which is among those things needing continual monitoring. We prefer to encourage the noble and sustained attempt to minimize risk of partiality masking as absolute truth, by taking, for example, an ongoing and active interest in alternative disciplines, schools of thought, sets of assumptions and so on, and by taking into account as well and as often as one can the limitations of one's operative framework of assumptions.

Viewed in the context of society, bias (in both senses) is a much more complex and systemic problem. Partiality masking as absolute truth is reflected in the structure and behavior of social institutions, including those

closest to the educational process, family and school. These are in turn reflected in the thinking of individual participants in these institutions: the parents and children, teachers and students, superintendents and school board members authors and publishers of textbooks, and so on. This is partly why bias remains of necessity persistently problematic; why we speak, therefore, of "working out an approach" to the problem of bias, as a part of an ongoing struggle. It is for this reason, among others, that we consider two central Socratic techniques of instruction, namely modeling and coaching—as opposed to proceduralization or regimentation—as among the most effective tools to guide, assist, and encourage students in this important struggle. We can come to recognize partial and limited perspectives as such only if students learn to question what they are given for belief, and, in circumstances in which they gain the perspective to question effectively and deeply.

As humans we create and live in meaning-schemes, with conceptual, cognitive, affective, and behavioral dimensions. Our ideas, constituted in this context, also constitute our experience. We cannot step outside our experience to look at it from some trans-ideational or completely detached standpoint. What we can do as critical thinkers is to maintain a rich ongoing sense of our ideational-embeddedness, but we cannot develop a single, correct meaning-scheme. Each conceptualization, whatever its strengths, has its liabilities. The cutting edge of the critical mind is shown in the depth and intensity with which it conducts its inner life, taking and accepting responsibility for its activity and the state of its comprehension and awareness. We can do a more or less critical job of constituting our thought and experience, but we cannot escape the consequences of the status of our thinking as self-constituted. These include blindness, to some degree, in some form, in some direction(s) or other(s). Thus our thinking can always benefit from discourse and critical exchange with other minds; this is indeed how we can correct and balance our thinking. If we commit to fair-mindedness, we struggle intimately with our own limited insight and hence with our bias. Though we may reduce, or even eliminate some misconceptions, some remain, and new ones develop. A good critical thinker lives with bias as, to use another very different metaphor, a good Christian lives with sin, not with acceptance and complacency, but with realism and vigilance.

CHAPTER 17: **Dialogical and Dialectical Thinking** [251-3]**Socratic Questioning and Dialogical Discussion**

Socratic discussion allows students to develop and evaluate their thinking in comparison to that of other students. Since inevitably students respond to Socratic questions within their own points of view, the discussion inevitably becomes multi-dimensional.

By routinely raising root questions and root ideas in a classroom setting, multiple points of view get expressed, but in a context in which the seminal ideas, which must be mastered to master the content, are deeply considered and their interrelationships established.

Over time, students learn from Socratic discussions a sense of intellectual discipline and thoroughness. They learn to appreciate the power of logic and logical thinking. They learn that all thoughts can be pursued in at least four directions:

- 1) **Their origin:** How did you come to think this? Can you remember the circumstances in which you formed this belief?
- 2) **Their support:** Why do you believe this? Do you have any evidence for this? What are some of the reasons why people believe this? In believing this aren't you assuming that such and so is true? Is that a sound assumption do you think?
- 3) **Their conflicts with other thoughts:** Some people might object to your position by saying How would you answer them? What do you think of this contrasting view? How would you answer the objection that ...? and,
- 4) **Their implications and consequences:** What are the practical consequences of believing this? What would we have to do to put it into action? What follows from the view that ...? Wouldn't we also have to believe that ... in order to be consistent? Are you implying that ...?

CHAPTER 19: **Socratic Questioning** [276-8]**A Taxonomy of Socratic Questions**

It is helpful to recognize, in light of the universal features in the logic of human thought, that there are identifiable categories of questions for the adept Socratic questioner to dip into: questions of clarification, questions that probe assumptions, questions that probe reasons and evidence, questions about viewpoints or perspectives, questions that probe implications and consequences, and questions about the question. Here are some examples of generic questions in each of these categories:

QUESTIONS OF CLARIFICATION

- What do you mean by _____?
- Could you give me an example?
- What is your main point?
- Would this be an example: _____?
- How does _____ relate to _____?
- Could you explain that further?
- Could you put that another way?
- Would you say more about that?
- Is your basic point _____ or _____?
- Why do you say that?
- What do you think is the main issue here?
- Let me see if I understand you; do you mean _____ or _____?
- How does this relate to our discussion (problem, issue)?
- What do you think John meant by his remark?
- What did you take John to mean?
- Jane, would you summarize in your own words what Richard has said?
... Richard, is that what you meant?

QUESTIONS THAT PROBE ASSUMPTIONS

- What are you assuming?
- What is Karen assuming?
- What could we assume instead?
- You seem to be assuming _____. Do I understand you correctly?
- All of your reasoning depends on the idea that _____.
- Why have you based your reasoning on _____ rather than _____?
- You seem to be assuming _____. How would you justify taking this for granted?
- Is it always the case? Why do you think the assumption holds here?
- Why would someone make this assumption?

QUESTIONS THAT PROBE REASON AND EVIDENCE

- What would be an example?
- Are these reasons adequate?
- How do you know?
- Why did you say that?
- Why do you think that is true?
- What led you to that belief?
- Do you have any evidence for that?
- How does that apply to this case?
- What difference does that make?
- What would change your mind?
- What are your reasons for saying that?

Richard Paul (1990)

What other information do we need?
Could you explain your reasons to us?
But is that good evidence to believe that?
Is there reason to doubt that evidence?
Who is in a position to know if that is so?
What would you say to someone who said _____?
Can someone else give evidence to support that response?
By what reasoning did you come to that conclusion?
How could we find out whether that is true?

QUESTIONS ABOUT VIEWPOINTS OR PERSPECTIVES

You seem to be approaching this issue from perspective. Why have you chosen this rather than that perspective?
How would other groups/types of people respond? Why? What would influence them?
How could you answer the objection that would make?
What might someone who believed _____ think?
Can/did anyone see this another way?
What would someone who disagrees say?
What is an alternative?
How are Ken's and Roxanne's ideas alike? Different?

QUESTIONS THAT PROBE IMPLICATIONS OR CONSEQUENCES

What are you implying by that?
When you say _____, are you implying _____?
But if that happened, what else would happen as a result? Why?
What effect would that have?
Would that necessarily happen or only probably happen?
What is an alternative?
If this and this are the case, then what else must also be true?
If we say that this is unethical, how about that?

QUESTIONS ABOUT THE QUESTION

How can we find out?
Is this the same issue as _____?
What does this question assume?
How would _____ put the issue?
Would _____ put the question differently?
Why is this question important?
How could someone settle this question?
Can we break this question down at all?
Is the question clear? Do we understand it?
Is this question easy or hard to answer? Why?

11 of 25

Does this question ask us to evaluate something?
Do we all agree that this is the question?
To answer this question, what questions would we have to answer first?
I'm not sure I understand how you are interpreting the main question...

To participate effectively in Socratic questioning, one must:

- listen carefully to what others say
- take what they say seriously
- look for reasons and evidence
- recognize and reflect upon assumptions
- discover implications and consequences
- seek examples, analogies, and objections
- seek to distinguish what one knows from what one merely believes
- seek to enter empathetically into others' perspectives or points of view
- be on the alert for inconsistencies, vagueness, and other possible problems in thought
- look beneath the surface of things
- maintain a healthy sense of skepticism
- be willing to helpfully play the role of devil's advocate

CHAPTER 21: Thirty-Five Dimensions of Critical Thinking [306-48]

Distinguishing Macro-Abilities from Micro-Skills

Our reason for dividing cognitive strategies into macro-abilities and microskills is not to create a hard and fast line between the most elementary skills of critical thinking (the micro-skills) and the process of orchestrating those elementary skills, but rather to provide teachers with a way of thinking about two levels of learning. We use these two levels in most complex abilities. For intuitive examples, consider learning to play the piano, learning to play good tennis, mastering ballet, or becoming a surgeon. In each of these areas, there is a level of skill learning which focuses on the most elementary moves. For example, learning to practice the most elementary ballet positions at the bar, learning to play scales on the piano, or learning to hit various tennis strokes on the backboard. One must often return to this microlevel to ensure that one keeps the fundamentals well in hand. Nevertheless, dancing ballet is not practicing at the bar. Playing the piano is not simply playing scales. And hitting tennis balls against a backboard is not playing tennis. One must move to the macro level for the real thing. So, too, in critical thinking. Students have to learn the fundamentals: What an assumption is, what an implication is, what an inference and conclusion are, what it is to isolate an issue, what it is to

offer reasons or evidence in support of what one says, how to identify a contradiction or a vague sentence.

But thinking critically in any actual situation is typically doing something more complex and holistic than this. Rarely in thinking critically do we do just one elementary thing. Usually we have to integrate or make use of a variety of elementary critical thinking skills. For example, when we read (a macro-ability) we have to make use of a variety of critical thinking microskills, and we have to use them in concert with each other. We might begin by reflecting on the implications of the title. We might then begin to read the preface or introduction and start to identify some of the basic issues or objectives the book or story focuses on. As we proceed, we might begin to identify particular sentences that seem vague to us. We might consider various interpretations of them. As we move along, we would doubtless dip into our own experience for possible examples of what the author is saying. Or we might begin to notice assumptions the author is making. We would be making all of these individual moves as part of one integrated activity: the attempt to make sense of, to follow, what we are reading. As always, the whole is greater and more important than the parts. We read, not to practice our critical thinking micro-skills. We use our critical thinking micro-skills in order to read, or better, in order to read clearly, precisely, and accurately. Keep this principle of interdependence in mind as you read through the various strategies.

The List of Strategies

AFFECTIVE STRATEGIES

O1 THINKING INDEPENDENTLY

Critical thinking is autonomous thinking, thinking for oneself. Many of our beliefs are acquired at an early age, when we have a strong tendency to form beliefs irrationally (because we want to believe, because we are rewarded for believing). Critical thinkers use critical skills and insights to reveal and eradicate beliefs to which they cannot rationally assent. In formulating new beliefs, critical thinkers do not passively accept the beliefs of others; rather, they analyze issues themselves, reject unjustified authorities, and recognize the contributions of justified authorities. They thoughtfully form principles of thought and action; they do not mindlessly accept those presented to them. They do not accept as true, or reject as false, beliefs they do not understand. They are not easily manipulated.

Independent thinkers strive to incorporate all known relevant knowledge and insight into their thought and behavior. They strive to determine for themselves when information is relevant, when to apply a concept, or when to make use of a skill.

O2 DEVELOPING INSIGHT INTO EGOCENTRICITY OR SOCIOCENTRICITY

Egocentricity is the confusion of immediate perception with reality. It manifests itself as an inability or unwillingness to consider others' points of view and to accept ideas or facts which would conflict with gratification of desire. In the extreme, it is characterized by a need to be right about everything, a lack of interest in consistency and clarity, an all or nothing attitude ("I am 100% right; you are 100% wrong."), and a lack of self-consciousness of one's own thought processes. The egocentric individual is more concerned with the appearance of truth, fairness, and fair-mindedness, than with actually being correct, fair, or fair-minded. Egocentricity is the opposite of critical thought.

As people are socialized, egocentricity partly evolves into sociocentricity. Egocentric identification extends to groups. The individual goes from "I am right!" to "We are right!" Put another way, people find that they can often best satisfy their egocentric desires through a group. 'Group think' results from egocentric attachment to a group. One can see this in both children and adults: My daddy is better than your daddy! My school (religion, country, race, etc.) is better than yours.

If egocentricity and sociocentricity are the disease, self-awareness is the cure. When their own egocentric commitments are not supported, few people accept another's egocentric reasoning. Most can identify the sociocentricity of members of opposing groups. Yet when we are thinking egocentrically or sociocentrically, it seems right to us (at least at the time). Our belief in our own rightness is easier to maintain because we suppress the faults in our thinking. We automatically hide our egocentricity from ourselves. We fail to notice when our behavior contradicts our self-image. We base our reasoning on false assumptions we are unaware of making. We fail to make relevant distinctions, though we are otherwise aware of, and able to make them (when making such distinctions does not prevent us from getting what we want). We deny or conveniently 'forget' facts inconsistent with our conclusions. We misunderstand or distort what others say.

The solution, then, is to reflect on our reasoning and behavior; to make our assumptions explicit, critique them, and, when they are false, stop making them; to apply the same concepts in the same ways to ourselves and others; to consider every relevant fact, and to make our conclusions consistent with the evidence; and to listen carefully and open-mindedly to those with whom we disagree. We can change egocentric tendencies when we see them for what they are: irrational and unjustified. Therefore, the development of students' awareness of their egocentric and sociocentric patterns of thought is a crucial part of education in critical thinking.

O3 EXERCISING FAIR-MINDEDNESS

To think critically about issues, we must consider the strengths and weaknesses of opposing points of view; imaginatively put ourselves in the place of others to genuinely understand them and overcome our egocentric tendency to identify truth with our immediate perceptions or 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. It also correlates with one's willingness to remember occasions when one was wrong in the past despite an intense feeling of correctness, as well as the ability to imagine being similarly deceived in a case at hand. Critical thinkers realize the unfairness and absurdity of judging unfamiliar ideas until they fully understand them. ("I don't know what you think but, whatever it is, it's wrong.")

The world contains many societies and people with many different points of view and ways of thinking. To develop as reasonable persons we need to enter into and think within the frameworks and ideas of different peoples and societies. We cannot truly understand the world if we think about it only from one viewpoint, as North Americans, as Italians, or as Soviets.

Furthermore, critical thinkers recognize that their behavior affects others, and so consider their behavior from the perspective of those others.

O4 EXPLORING THOUGHTS UNDERLYING FEELINGS AND FEELINGS UNDERLYING THOUGHTS

Although many separate thought and feeling as though they were independent, even opposing, forces in the human mind, the truth is that virtually all human feelings are based on some level of thought and virtually all thought generative of some level of feeling. To think with self-understanding and insight, we must come to terms with the intimate connections between thought and feeling, reason and emotion. Critical thinkers realize that their feelings are their response (but not the only possible, or necessarily the most reasonable, response) to a situation. They know that their feelings would be different if they had a different understanding or interpretation of that situation. They recognize that thoughts and feelings, far from being different kinds of "things", are two aspects of their responses. Uncritical thinkers see little or no relationship between their feelings and their thoughts.

When we feel sad or depressed, it is often because we are interpreting our situation in an overly negative or pessimistic light. We may be forgetting to consider the situation's positive aspects. We better understand our feelings by asking ourselves, "How have I come to feel this way? How am I looking at the situation? To what conclusion have I come? What is my evidence? What assumptions am I making? What inferences am I making? Are

they sound? Are there other possible ways to interpret this situation?" We can learn to seek patterns in our assumptions, and so begin to see the unity behind our separate emotions. Understanding oneself is the first step toward self-control and self-improvement. This self-understanding requires that we understand our feelings and emotions in relation to our thoughts, ideas, and interpretations of the world.

O5 DEVELOPING INTELLECTUAL HUMILITY AND SUSPENDING JUDGMENT

Critical thinkers recognize the limits of their knowledge. They understand when their native egocentrism is likely to function self-deceptively; they are sensitive to bias, prejudice, and limitations of their views. Intellectual humility is based on the recognition that one should not claim more than one actually knows. It does not imply spinelessness or submissiveness. It implies the lack of intellectual pretentiousness, arrogance, or conceit. It implies insight into the foundations of one's beliefs: knowing what evidence one has, how one has come to believe, what further evidence one might examine or seek out.

Thus, critical thinkers distinguish what they know from what they don't know. They are not afraid of saying "I don't know" when they are not in a position to be sure. They can make this distinction because they habitually ask themselves, "How could one know if this is true?" To say "In this case I must suspend judgment until I find out x and y," does not make them anxious or uncomfortable. They are willing to rethink conclusions in the light of new knowledge. They qualify their claims appropriately.

O6 DEVELOPING INTELLECTUAL COURAGE

To think independently and fairly, one must feel the need to face and fairly deal with unpopular ideas, beliefs, or viewpoints. The courage to do so arises from the recognition that ideas considered dangerous or absurd are sometimes rationally justified (in whole or in part) and that conclusions or 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". We need courage to admit the truth in some ideas considered dangerous and absurd, and the distortion or falsity in some ideas strongly held in our social group. It takes courage to be true to our own thinking, for honestly questioning our deeply held beliefs can be difficult and sometimes frightening, and the penalties for non-conformity are often severe.

O7 DEVELOPING INTELLECTUAL GOOD FAITH OR INTEGRITY

Critical thinkers recognize the need to be true to their own thought, to be consistent in the intellectual standards they apply, to hold themselves to the same rigorous standards of evidence and proof to which they hold others, to practice what they advocate for others, and to honestly admit

discrepancies and inconsistencies in their own thought and action. They believe most strongly what has been justified by their own thought and analyzed experience. They are committed to bringing the self they are and the self they want to be together. People in general are often inconsistent in their application of standards once their ego is involved positively or negatively. For example, when people like us, we tend to over-estimate their positive characteristics; when they dislike us, we tend to underrate them.

08 DEVELOPING INTELLECTUAL PERSEVERANCE

Becoming a more critical thinker is not easy. It takes time and effort. All important learning takes time and effort. Critical thinkers are willing to pursue intellectual insights and truths in spite of difficulties, obstacles, and frustrations. They recognize the need to struggle with confusion and unsettled questions for a long time to achieve deeper understanding and insight. They recognize that significant change requires patience and hard work. Important issues often require extended thought, research, struggle. Considering a new view takes time. Yet people are often impatient to "get on with it" when they most need to slow down and think carefully. People rarely define issues or problems clearly; concepts are often left vague; related issues are not sorted out, etc. "I don't want to think about it. It's too complicated." or "We know what's wrong, so let's just fix it." Students need to gain insight into the need for intellectual perseverance.

09 DEVELOPING CONFIDENCE IN REASON

The rational person recognizes the power of reason, the value of disciplining thinking in accordance with rational standards. Virtually all the progress made in science and human knowledge testifies to this power, and so to the reasonability of having confidence in reason. To develop this faith is to see that ultimately one's own higher interests and those of humankind at large will be served best by giving the freest play to reason, by encouraging people to come to their own conclusions through a process of developing their own rational faculties. It is to believe that, with proper encouragement and cultivation, people can develop the ability to think for themselves, to form reasonable points of view, draw reasonable conclusions, think coherently and logically, persuade each other by reason and, ultimately, become reasonable persons, despite the deep-seated obstacles in the native character of the human mind and in society as we know it. It is to reject force and trickery as standard ways of changing another's mind. This confidence is essential to building a democracy in which people come to genuine rule, rather than being manipulated by the mass media, special interests, or by the inner prejudices, fears, and irrationalities that so easily and commonly tend to dominate human minds.

You should note that the act of faith we recommend is not blind but should be tested in everyday experiences and academic work. In other words, we should have confidence in reason because reason works. Confidence in reason does not deny the reality of intuition; rather, it provides a way of distinguishing intuition from prejudice.

COGNITIVE STRATEGIES—MACRO-ABILITIES

10 REFINING GENERALIZATIONS AND AVOIDING OVERSIMPLIFICATIONS

We naturally simplify problems and experiences to make them easier to deal with. Everyone does this. However, the uncritical thinker often oversimplifies, and so misrepresents problems and experiences. What should be recognized as complex, intricate, ambiguous, or subtle is viewed as simple, elementary, clear, and obvious. For example, it is typically an oversimplification to view people or groups as all good or all bad, actions as always right or always wrong, one contributing factor as the cause, etc., and yet such beliefs are common. Critical thinkers try to find simplifying patterns and solutions but not by misrepresentation or distortion. Making a distinction between useful simplifications and misleading oversimplifications is important to critical thinking.

One of the strongest tendencies of the egocentric, uncritical mind is to see things in terms of black and white, "all right" and "all wrong". Hence, beliefs which should be held with varying degrees of certainty are held as certain. Critical thinkers are sensitive to this problem. They understand the relationship of evidence to belief and so qualify their statements accordingly. The tentativeness of many of their beliefs is characterized by the appropriate use of such qualifiers as 'highly likely', 'probably', 'not very likely', 'highly unlikely', 'often', 'usually', 'seldom', 'I doubt', 'I suspect', 'most', 'many', and 'some'.

Critical thinkers scrutinize generalizations, probe for possible exceptions, and then use appropriate qualifications. Critical thinkers are not only clear, but also exact or precise.

11 COMPARING ANALOGOUS SITUATIONS:

Transferring Insights to New Contexts

An idea's power is limited by our capacity to see its application. Critical thinkers' ability to use ideas mindfully enhances their ability to transfer ideas critically. They practice using ideas and insights by appropriately applying them to new situations. This allows them to organize materials and experiences in different ways, to compare and contrast alternative labels, to integrate their understanding of different situations, and to find fruitful ways to conceptualize novel situations. Each new application of an idea enriches understanding of both the idea applied and the situation to which it is applied.

12 DEVELOPING ONE'S PERSPECTIVE:

Creating or Exploring Beliefs, Arguments, or Theories

The world is not given to us sliced up into categories with pre-assigned labels on them. There are always many ways we can "divide up" and so experience the world. How we do so is essential to our thinking and behavior. Uncritical thinkers assume that their perspective on things is the only correct one. Selfish critical thinkers manipulate the perspectives of others to gain advantage for themselves. Fair-minded critical thinkers learn to recognize that their own way of thinking and that of all other perspectives are subject to error. They learn to develop their point of view through a critical analysis of their experience. They learn to question commonly accepted ways of understanding things and avoid uncritically accepting the viewpoints of their peer groups or society. They know what their perspectives are and can talk insightfully about them. To do this, they must create and explore their own beliefs, their own reasoning, and their own theories.

13 CLARIFYING ISSUES, CONCLUSIONS, OR BELIEFS

The more completely, clearly, and accurately an issue or statement is formulated, the easier and more helpful the discussion of its settlement or verification. Given a clear statement of an issue, and prior to evaluating conclusions or solutions, we should understand what we would have to do to settle it. And before we can agree or disagree with a claim, we must understand it clearly. It makes no sense to say "I don't know what you are claiming, but I deny it, whatever it is." Critical thinkers recognize problematic claims, concepts, and standards of evaluation, making sure that understanding precedes judgment. They routinely distinguish facts from interpretations, opinions, judgments, or theories. They can then raise those questions most appropriate to understanding and evaluating each.

14 CLARIFYING AND ANALYZING THE MEANINGS OF WORDS OR PHRASES

Critical, independent thinking requires clarity of thought. A clear thinker understands concepts and knows what kind of evidence is required to justify applying a word or phrase to a situation. The ability to supply a definition is not proof of understanding. One must be able to supply clear, obvious examples and use the word or phrase appropriately. In contrast, for an unclear thinker, words float through the mind unattached to clear, specific, concrete cases. Distinct concepts are confused. Often the only criterion for the application of a term is that the case in question "seems like" an example. Irrelevant associations are confused with what are necessary parts of the idea (e.g., "Love involves flowers and candlelight"). Unclear thinkers lack independence of thought because they lack the ability to analyze a concept, and so critique its use.

15 DEVELOPING CRITERIA FOR EVALUATION:

Clarifying Values and Standards

Critical thinkers realize that expressing mere preference does not substitute for evaluating something. Awareness of the process or components of evaluating facilitates thoughtful and fair-minded evaluation. This process requires the development and use of criteria or standards of evaluation, or making standards or criteria explicit. Critical thinkers are aware of the values on which they base their judgments. They have clarified them and understand why they are values.

When developing criteria, critical thinkers should understand the object and purpose of the evaluation, and what function the thing being evaluated is supposed to serve. Critical thinkers take into consideration different points of view when attempting to evaluate something.

16 EVALUATING THE CREDIBILITY OF SOURCES OF INFORMATION

Critical thinkers recognize the importance of using reliable sources of information when formulating conclusions. They give less weight to sources which either lack a track record of honesty, contradict each other on key questions, are not in a position to know, or have a vested interest in influencing belief. Critical thinkers recognize when more than one reasonable position can be taken on an issue; they compare alternative sources of information, noting areas of agreement; they analyze questions to determine whether or not the source is in a position to know; and they gather further information where sources disagree. They recognize obstacles to gathering accurate and pertinent information. They realize that preconception, for example, influences observation—that we often see only what we expect to see and fail to notice things we aren't looking for.

17 QUESTIONING DEEPLY:

Raising and Pursuing Root or Significant Questions

Critical thinkers can pursue an issue in depth, covering germane aspects in an extended process of thought or discussion. When reading a passage, they look for issues and concepts underlying the claims expressed. They come to their own understanding of the details they learn, placing them in the larger framework of the subject and their overall perspective. They contemplate the significant issues and questions underlying subjects or problems studied. They can move between basic underlying ideas and specific details. When pursuing a line of thought, they are not easily sidetracked. They use important issues to organize their thought and are not bound by the organization given by another. Nor are they unduly influenced by the language of another. If they find that a set of categories or distinctions is more appropriate than that suggested by another, they will use it. Recognizing that

Richard Paul (1990)

categories serve human purposes, they use those categories which best serve their purpose at the time. They are not limited by accepted ways of doing things. They evaluate both goals and how to achieve them.

18 ANALYZING OR EVALUATING ARGUMENTS, INTERPRETATIONS, BELIEFS, OR THEORIES

Rather than carelessly agreeing or disagreeing with a line of reasoning based on their preconceptions of what is true, critical thinkers use analytic tools to understand it and determine its relative strengths and weaknesses. When analyzing arguments, critical thinkers recognize the importance of asking for reasons and considering alternative views. They are especially sensitive to possible strengths of arguments that they disagree with, recognizing the tendency of humans to ignore, oversimplify, distort, or otherwise unfairly dismiss them. Critical thinkers analyze questions and place conflicting arguments, interpretations, and theories in opposition to one another, as a means of highlighting key concepts, assumptions, implications, etc.

When giving or being given an interpretation, critical thinkers, recognizing the difference between evidence and interpretation, explore the assumptions on which it is based, and propose and evaluate alternative interpretations for their relative strength. Autonomous thinkers consider competing theories and develop their own theories.

19 GENERATING OR ASSESSING SOLUTIONS

Critical problem-solvers use everything available to them to find the best solution they can. They evaluate solutions, not independently of, but in relation to one another (since 'best' implies a comparison). They take the time to formulate problems clearly, accurately, and fairly, rather than offering a sloppy, half-baked description and then immediately leaping to a solution. They examine the causes of the problem at length. They ask, "What makes some solutions better than others? What does the solution to this problem require? What solutions have been tried for this and similar problems? With what results?" But alternative solutions are often not given, they must be generated or thought-up. Critical thinkers must be creative thinkers as well, generating possible solutions in order to find the best one. Very often a problem persists, not because we can't tell which available solution is best but because the best solution has not yet been made available—no one has thought it up yet. Therefore, although critical thinkers use all available information relevant to their problems, including the results of solutions others have used in similar situations, they are flexible and imaginative, willing to try any good idea whether it has been done before or not.

Fair-minded thinkers take into account the interests of everyone affected by the problem and proposed solutions. They are more committed

16 of 25

to finding the best solution than to getting their way. They approach problems realistically.

20 ANALYZING OR EVALUATING ACTIONS AND POLICIES

Critical thinking involves more than an analysis of clearly formulated instances of reasoning; it includes analysis of behavior or policy and a recognition of the reasoning that behavior or policy presupposes. When evaluating the behavior of themselves and others, critical thinkers are conscious of the standards they use, so that these, too, can become objects of evaluation. Critical thinkers examine the consequences of actions and recognize these as fundamental to the standards for assessing both behavior and policy.

Critical thinkers base their evaluations of behavior on assumptions to which they have rationally assented. They have reflected on such root questions as: What makes some actions right, others wrong? What rights do people have? How can I know when someone's rights are being violated? Why respect people's rights? Why be good? Should I live according to rules? If so, what rules? If not, how should I decide what to do? What policies should be established and why? What are governments supposed to do? What shouldn't they do?

21 READING CRITICALLY: Clarifying or Critiquing Texts

Critical thinkers read with a healthy skepticism. But they do not doubt or deny until they understand. They clarify before they judge. They realize that everyone is capable of making mistakes and being wrong, including authors of textbooks. They also realize that, since everyone has a point of view, everyone sometimes leaves out some relevant information. No two authors would write the same book or write from exactly the same perspective. Therefore, critical readers recognize that reading a book is reading one limited perspective on a subject and that more can be learned by considering other perspectives. Critical readers ask themselves questions as they read, wonder about the implications of, reasons for, examples of, and meaning and truth of the material. They do not approach written material as a collection of sentences, but as a whole, trying out various interpretations until one fits all of the work, rather than ignoring or distorting statements that don't fit their interpretation.

22 LISTENING CRITICALLY: The Art of Silent Dialogue

Critical thinkers realize that listening can be done passively and uncritically or actively and critically. They know that it is easy to misunderstand what another says and difficult to integrate another's thinking

into our own. Compare speaking and listening. When we speak, we need only keep track of our own ideas, arranging them in some order, expressing thoughts with which we are intimately familiar: our own. But listening is more complex. We must take the words of another and translate them into ideas that make sense to us. We have not had the experiences of the speakers. We are not on the inside of their point of view. We can't anticipate, as they can themselves, where their thoughts are leading them. We must continually interpret what others say within the confines of our experiences. We must find a way to enter into their points of view, shift our minds to follow their trains of thought.

In short, we need to learn how to listen actively and critically. We need to recognize that listening is an art involving skills that we can develop only with time and practice. We need to learn, for example, that to listen and learn from what we are hearing, we need to learn to ask key questions that enable us to locate ourselves in the thought of another. We must practice asking questions like the following: "I'm not sure I understand you when you say ..., could you explain that further?" "Could you give me an example or illustration of this?" "Would you also say ...?" "Let me see if I understand you. What you are saying is Is that right?" "How do you respond to this objection?" Critical readers ask questions as they read and use those questions to orient themselves to what an author is saying. Critical listeners ask questions as they listen to orient themselves to what a speaker is saying: Why does she say that? What examples could I give to illustrate that point? What is the main point? How does this detail relate? Is she using this word as I would, or somewhat differently? These highly skilled and activated processes are crucial to learning. We need to heighten student awareness of and practice in them as often as we can.

23 MAKING INTERDISCIPLINARY CONNECTIONS

Although in some ways it is convenient to divide knowledge up into disciplines, the divisions are not absolute. Critical thinkers don't allow the somewhat arbitrary distinctions between academic subjects to control their thinking. When considering issues which transcend subjects, they bring relevant concepts, knowledge, and insights from many subjects to the analysis. They make use of insights into one subject to inform their understanding of other subjects. There are always connections between subjects (language and logic; history, geography, psychology, anthropology, physiology; politics, geography, science, ecology; math, science, economics). To understand, say, reasons for the American Revolution (historical question), insights from technology, geography, economics, philosophy, etc., can fruitfully apply.

24 PRACTICING SOCRATIC DISCUSSION:

Clarifying and Questioning Beliefs, Theories, or Perspectives

Critical thinkers are nothing, if not questioners. The ability to question and probe deeply, to get down to root ideas, to get beneath the mere appearance of things, is at the very heart of critical thought. And, as questioners, they have many different kinds of questions and moves available and can follow up their questions appropriately. They can use questioning techniques, not to make others look stupid, but to learn what they think, helping them develop their ideas, or as a prelude to evaluating them. When confronted with a new idea, they want to understand it, to relate it to their experience, and to determine its implications, consequences, and value. They can fruitfully uncover the structure of their own and others' perspectives. Probing questions are the tools by which these goals are reached.

Furthermore, critical thinkers are comfortable being questioned. They don't become offended, confused, or intimidated. They welcome good questions as an opportunity to develop a line of thought.

25 REASONING DIALOGICALLY:

Comparing Perspectives, Interpretations, or Theories

Dialogical thinking refers to thinking that involves a dialogue or extended exchange between different points of view, cognitive domains, or frames of reference. Whenever we consider concepts or issues deeply, we naturally explore their connections to other ideas and issues within different domains or points of view. Critical thinkers engage in fruitful, exploratory dialogue, proposing ideas, probing their roots, considering subject matter insights and evidence, testing ideas, and moving between various points of view. When we think, we often engage in dialogue, either inwardly or aloud with others. We need to integrate critical thinking skills into that dialogue so that it is as fruitful as possible. Socratic questioning is one form of dialogical thinking.

26 REASONING DIALECTICALLY:

Evaluating Perspectives, Interpretations, or Theories

Dialectical thinking refers to dialogical thinking conducted in order to test the strengths and weaknesses of opposing points of view. Court trials and debates are dialectical in form and intention. They pit idea against idea, reasoning against counter-reasoning, to get at the truth of a matter. As soon as we begin to explore ideas, we find that some clash or are inconsistent with others. To integrate our thinking, we must assess which of the conflicting ideas we will provisionally accept and which we shall provisionally reject, or which parts of the views are strong and which weak, or how the views can be reconciled. Students need to develop dialectical reasoning skills, so that their

thinking not only moves comfortably between divergent points of view or lines of thought, but also makes some assessments in light of the relative strengths and weaknesses of the evidence or reasoning presented. Hence, when thinking dialectically, critical thinkers use critical micro-skills appropriately; they evaluate evidence and assumptions, explore implications and consequences, pinpoint contradictions, clarify, and so on.

COGNITIVE STRATEGIES—MICRO-SKILLS

27 COMPARING AND CONTRASTING IDEALS WITH ACTUAL PRACTICE

Self-improvement and social improvement are presupposed values of critical thinking. Critical thinking, therefore, requires an effort to see ourselves and others accurately. This requires recognizing gaps between facts and ideals. The fair-minded thinker values truth and consistency and, hence, works to minimize these gaps. The confusion of facts with ideals prevents us from better achieving our ideals. A critical education strives to highlight discrepancies between facts and ideals, and proposes and evaluates methods for minimizing them. This strategy is intimately connected with "developing intellectual good faith".

28 THINKING PRECISELY ABOUT THINKING: Using Critical Vocabulary

An essential requirement of critical thinking is the ability to think about thinking, to engage in what is sometimes called 'metacognition'. One possible definition of critical thinking is the art of thinking about your thinking while you're thinking in order to make your thinking better: more clear, more accurate, more fair. It is precisely at the level of "thinking about thinking" that most critical thinking stands in contrast to uncritical thinking. The analytical vocabulary in the English language (such terms as 'assume', 'infer', 'conclude', 'criteria', 'point of view', 'relevance', 'issue', 'elaborate', 'ambiguous', 'objection', 'support', 'bias', 'justify', 'perspective', 'contradiction', 'credibility', 'evidence', 'interpret', 'distinguish') enables us to think more precisely about our thinking. We are in a better position to assess reasoning (our own, as well as that of others) when we can use analytic vocabulary with accuracy and ease.

29 NOTING SIGNIFICANT SIMILARITIES AND DIFFERENCES

Critical thinkers strive to treat similar things similarly and different things differently. Uncritical thinkers, on the other hand, often miss significant similarities and differences. Things superficially similar are often significantly different. Things superficially different are often essentially the same. Only by developing our observational and reasoning skills to a high point can we become sensitized to significant similarities and differences. As we develop this sensitivity, it influences how we experience, how we describe, how we categorize, and how we reason about things. We become more careful and

discriminating in our use of words and phrases. We hesitate before we accept this or that analogy or comparison.

We recognize the purposes of the comparisons we make. We recognize that purposes govern the act of comparing and determine its scope and limits. The hierarchy of categories biologists, for instance, use to classify living things reflects biological judgment regarding which kinds of similarities and differences between species are the most important biologically and which shed the most light on how each organism is structured and how it operates. To the zoologist, the similarities whales have to horses is considered more important than their similarities to fish. The differences between whales and fish are considered more significant than those between whales and horses.

30 EXAMINING OR EVALUATING ASSUMPTIONS

We are in a better position to evaluate any reasoning or behavior when all of the elements of that reasoning or behavior are made explicit. We base both our reasoning and our behavior on beliefs we take for granted. We are often unaware of these assumptions. Only by recognizing them can we evaluate them. Critical thinkers have a passion for truth and for accepting the strongest reasoning. Thus, they have the intellectual courage to seek out and reject false assumptions. They realize that everyone makes some questionable assumptions. They are willing to question, and have others question, even their own most cherished assumptions. They consider alternative assumptions. They base their acceptance or rejection of assumptions on their rational scrutiny of them. They hold questionable assumptions with an appropriate degree of tentativeness. Independent thinkers evaluate assumptions for themselves, and do not simply accept the assumptions of others, even those assumptions made by everyone they know.

31 DISTINGUISHING RELEVANT FROM IRRELEVANT FACTS

Critical thinking requires sensitivity to the distinction between those facts that are relevant to an issue and those that are not. Critical thinkers focus their attention on relevant facts and do not let irrelevant considerations affect their conclusions. Furthermore, they recognize that a fact is only relevant or irrelevant in relation to an issue. Information relevant to one problem may not be relevant to another. Uncritical thinkers don't fail to realize facts or considerations must be relevant, they fail to realize that what seems relevant may not be relevant and that what seems irrelevant may be relevant. Ability to judge relevance can be developed only through practice, not by admonitions "Stick to the point".

32 MAKING PLAUSIBLE INFERENCES, PREDICTIONS, OR INTERPRETATIONS

Thinking critically involves the ability to reach sound conclusions based on observation and information. Critical thinkers distinguish their observations from their conclusions. They look beyond the facts, to see what those facts imply. They know what the concepts they use imply. They also distinguish cases in which they can only guess from cases in which they can safely conclude. Critical thinkers recognize their tendency to make inferences that support their own egocentric or sociocentric world views and are therefore especially careful to evaluate inferences they make when their interests or desires are involved. Remember, every interpretation is based on inference, and we interpret every situation we are in.

33 EVALUATING EVIDENCE AND ALLEGED FACTS

Critical thinkers can take their reasoning apart in order to examine and evaluate its components. They know on what evidence they base their conclusions. They realize that unstated, unknown reasons can be neither communicated or critiqued. They can insightfully discuss evidence relevant to the issue or conclusions they consider. Not everything offered as evidence should be accepted. Evidence and factual claims should be scrutinized and evaluated. Evidence can be complete or incomplete, acceptable, questionable, or false.

34 RECOGNIZING CONTRADICTIONS

Consistency is a fundamental—some would say the defining—ideal of critical thinkers. They strive to remove contradictions from their beliefs, and are wary of contradictions in others. As would-be fair-minded thinkers they strive to judge like cases in a like manner.

Perhaps the most difficult form of consistency to achieve is that between word and deed. Self-serving double standards are one of the most common problems in human life. Children are in some sense aware of the importance of consistency. ("Why don't I get to do what they get to do?") They are frustrated by double standards, yet are given little help in getting insight into them and dealing with them.

Critical thinkers can pinpoint specifically where opposing arguments or views contradict each other, distinguishing the contradictions from compatible beliefs, thus focussing their analyses of conflicting views.

35 EXPLORING IMPLICATIONS AND CONSEQUENCES

Critical thinkers can take statements, recognize their implications (that is, if x is true, then y must also be true) and develop a fuller, more complete understanding of their meaning. They realize that to accept a statement one must also accept its implications. They can explore both implications and consequences at length. When considering beliefs that relate

to actions or policies, critical thinkers assess the consequences of acting on those beliefs.

CHAPTER 35: The Contribution of Philosophy to Thinking [472-82]

Values and Intellectual Traits

Philosophical differences are common, even in the lives of small children. Children often reason from the assumption that their needs and desires are more important than anyone else's to the conclusion that they ought to get what they want in this or that circumstance. It often seems absurd to children that they are not given what they want. They are trapped in their egocentric viewpoints, see the world from within them, and unconsciously take their viewpoints (their philosophies, if you will) to define reality. To work out of this intellectual entrapment requires time and much reflection.

To develop consciousness of the limits of our understanding we must attain the courage to face our prejudices and ignorance. To discover our prejudices and ignorance in turn we often have to empathize with and reason within points of view toward which we are hostile. To achieve this end, we must persevere over an extended period of time, for it takes time and significant effort to learn how to empathically enter a point of view against which we are biased. That effort will not seem justified unless we have the faith in reason to believe we will not be tainted or taken in by whatever is false or misleading in this opposing viewpoint. Furthermore, the belief alone that we can survive serious consideration of alien points of view is not enough to motivate most of us to consider them seriously. We must also be motivated by an intellectual sense of justice. We must recognize an intellectual responsibility to be fair to views we oppose. We must feel obliged to hear them in their strongest form to ensure that we do not condemn them out of ignorance or bias.

If we approach thinking or teaching for thinking atomistically, we are unlikely to help students gain the kind of global perspective and global insight into their minds, thought, and behavior which a philosophical approach to thinking can foster. Cognitive psychology tends to present the mind and dimensions of its thinking in just this atomistic way. Most importantly, it tends to leave out of the picture what should be at its very center: the active, willing, judging agent. The character of our mind is one with our moral character. How we think determines how we behave and how we behave determines who we are and who we become. We have a moral as well as an intellectual responsibility to become fair-minded and rational, but we will not become so unless we cultivate these traits through specific modes of thinking.

From a philosophical point of view, one does not develop students' thinking skills without in some sense simultaneously developing their autonomy, their rationality, and their character. This is not fundamentally a matter of drilling the student in a battery of skills. Rather it is essentially a matter of orchestrating activities to continually stimulate students to express and to take seriously their own thinking: what it assumes, what it implies, what it includes, excludes, highlights, and foreshadows; and to help the student do this with intellectual humility, intellectual courage, intellectual empathy, intellectual perseverance, and fair-mindedness.

The Skills and Processes of Thinking

Philosophers do not tend to approach the micro-skills and macro-processes of thinking from the same perspective as cognitive psychologists. Intellectual skills and processes are approached not from the perspective of the needs of empirical research but from the perspective of achieving personal, rational control. The philosophical is, as I have suggested, a person-centered approach to thinking. Thinking is always the thinking of some actual person, with some egocentric and sociocentric tendencies, with some particular traits of mind, engaged in the problems of a particular life. The need to understand one's own mind, thought, and action cannot be satisfied with information from empirical studies about aspects or dimensions of thought. The question foremost in the mind of the philosopher is not "How should I conceive of the various skills and processes of the human mind to be able to conduct empirical research on them?" but "How should I understand the elements of thinking to be able to analyze, assess, and rationally control my own thinking and accurately understand and assess the thinking of others?" Philosophers view thinking from the perspective of the needs of the thinker trying to achieve or move toward an intellectual and moral ideal of rationality and fair-mindedness. The tools of intellectual analysis result from philosophy's 2,500 years of thinking and thinking about thinking.

Since thinking for one's self is a fundamental presupposed value for philosophy, the micro-skills philosophers use are intellectual moves that a reasoning person continually makes, independent of the subject matter of thought. Hence, whenever one is reasoning, one is reasoning about some issue or problem (hence needs skills for analyzing and clarifying issues and problems). Likewise, whenever one is reasoning, one is reasoning from some point of view or within some conceptual framework (hence needs skills for analyzing and clarifying interpretations or interpretive frameworks.) Finally, whenever one is reasoning, one is, in virtue of one's inferences, coming to some conclusions from some beliefs or premises which, in turn, are based on some assumptions (hence needs skills for analyzing, clarifying, and evaluating

beliefs, judgments, inferences, implications, and assumptions.) For virtually any reasoning, one needs a variety of interrelated processes and skills. Hence, from the philosophical point of view, the fundamental question is not whether one is solving problems or making decisions or engaging in scientific inquiry or forming concepts or comprehending or composing or arguing, precisely because one usually does most or all of them in every case. Problem solving, decision-making, concept formation, comprehending, composing, and arguing are in some sense common to all reasoning. What we as reasoners need to do, from the philosophical point of view, is not to decide which of these things we are doing, but rather to orchestrate any or all of the following macro-processes:

- 1 **Socratic Questioning:** questioning ourselves or others so as to make explicit the salient features of our thinking:
 - a What precisely is at issue? Is this the fairest way to put the issue?
 - b From what point of view are we reasoning? Are there alternative points of view from which the problem or issue might be approached?
 - c What assumptions are we making? Are they justified? What alternative assumptions could we make instead?
 - d What concepts are we using? Do we grasp them? Their appropriateness? Their implications?
 - e What evidence have we found or do we need to find? How dependable is our source of information?
 - f What inferences are we making? Are those inferences well supported?
 - g What are the implications of our reasoning?
 - h How does our reasoning stand up to competing or alternative reasoning?
 - i Are there objections to our reasoning we should consider?
- 2 **Conceptual Analysis:** Any problematic concepts or uses of terms must be analyzed and their basic logic set out and assessed. Have we done so?
- 3 **Analysis of the Question-at-Issue:** Whenever one is reasoning, one is attempting to settle some question at issue. But to settle a question, one must understand the kind of question it is. Different questions require different modes of settlement. Do we grasp the precise demands of the question-at-issue?
- 4 **Reconstructing Alternative Viewpoints in their Strongest Forms:** Since whenever one is reasoning, one is reasoning from a point of view or within a conceptual framework, one must identify and reconstruct those views. Have we empathically reconstructed the relevant points of view?
- 5 **Reasoning Dialogically and Dialectically:** Since there are almost always alternative lines of reasoning about a given issue or problem, and since a reasonable person sympathetically considers them, one must engage in

dialectical reasoning. Have we reasoned from a variety of points of view (when relevant) and rationally identified and considered the strengths and weaknesses of these points of view as a result of this process?

Implicit in the macro-processes, as suggested earlier, are identifiable micro-skills. These constitute moves of the mind while thinking in a philosophical, and hence in a rational, critically-creative way. The moves are marked in the critical-analytic vocabulary of everyday language. Hence in Socratically questioning someone we are engaging in a process of thought. Within that process we make a variety of moves. We can make those moves explicit by using analytic terms such as these:

claims, assumes, implies, infers, concludes, is supported by, is consistent with, is relevant to, is irrelevant to, has the following implications, is credible, plausible, clear, in need of analysis, without evidence, in need of verification, is empirical, is conceptual, is a judgment of value, is settled, is at issue, is problematic, is analogous, is biased, is loaded, is well confirmed, is theoretical, hypothetical, a matter of opinion, a matter of fact, a point of view, a frame of reference, a conceptual framework, etc.

To put the point another way, to gain command of our thinking we must be able to take it apart and put it back together in light of its logic, the patterns of reasoning that support it, oppose it, and shed light on its rational acceptability. We don't need a formal or technical language to do this, but we do need a command of the critical-analytic terms available in ordinary English. Their careful use helps discipline, organize, and render self-conscious our ordinary inferences and the concepts, values, and assumptions that underlie them.

CHAPTER 37: **Critical Thinking and Language Arts** [502-10]

Consider language itself and the way in which an ideal student might approach it. We want students to be sensitive to their language, striving to understand it and use it thoughtfully, accurately, and clearly. We want them to become autonomous thinkers and so command, rather than be commanded by, language.

AS CRITICAL READER

Critical readers of literature approach literature as an opportunity to live within another's world or experience, to consider someone else's view of human nature, relationships, and problems. Critical readers familiarize themselves with different uses of language to enhance their understanding and appreciation of literature. They choose to read literature because they recognize its worth. They can intelligently discuss it with others, considering the interpretations of others as they support their own.

Critical readers approach a piece of nonfiction with a view to entering a silent dialogue with the author. They realize they must actively reconstruct the author's meaning. They read because there is much that they know they do not know, much to experience that they have not experienced. Thus, critical readers do not simply pass their eyes over the words with the intention of filling their memories. They question, organize, interpret, synthesize, and digest what they read. They question, not only what was said, but also what was implied and presupposed. They organize the details, not only around key ideas in the work, but also around their own key ideas. They not only interpret, they recognize their interpretations as interpretations, and consider alternative interpretations. Recognizing their interpretations as such, they revise and refine them. They do not simply accept or reject; they work to make ideas their own, accepting what makes most sense, rejecting what is ill-thought-out, distorted, and false, fitting their new understanding into their existing frameworks of thought.

AS CRITICAL WRITER

Command of reading and command of writing go hand-in-hand. All of the understanding, attitudes, and skills we have just explored have parallels in writing. When writing, critical writers recognize the challenge of putting their ideas and experiences into words. They recognize that inwardly many of our ideas are a jumble, some supporting and some contradicting other ideas, some vague, some clear, some true, some false, some expressing insights, some reenacting prejudices or mindless conformity. Since critical writers recognize that they only partially understand and only partially command their own ideas and experiences, they recognize a double difficulty in making those ideas and experiences accessible to others.

As readers they recognize they must actively reconstruct an author's meaning; as writers they recognize the parallel need to actively construct their own meanings as well as the probable meanings of their readers. In short, critical writers engage in parallel tasks when writing to those of reading. Both are challenging. Both organize, engage, and develop the mind. Both require the full and heightened involvement of critical and creative thought.

AS CRITICAL LISTENER

The most difficult condition in which to learn is in that of a listener. People naturally become passive when listening, leave to the speaker the responsibility to express and clarify, to organize and exemplify, to develop and conclude. The art of becoming a critical listener is therefore the hardest and the last art that students develop. Of course, most students never develop this art. Most students remain passive and impressionistic in their listening throughout their lives.

Richard Paul (1990)

Yet this need not be the case. If students can come to grasp the nature of critical reading and writing, they can also grasp the nature of critical listening. Once again, each of the understandings, attitudes, and skills of reading and writing have parallels in listening. There is the same challenge to sort out, to analyze, to consider possible interpretations, the same need to ask questions, to raise possible objections, to probe assumptions, to trace implications. As listeners we must follow the path of another person's thought. Listening is every bit as dialogical as reading and writing, though harder, since we cannot go back over the words of the speaker as we can when reading.

What is more, our students face a special problem in listening to a teacher, for if they listen so as to take seriously what is being said, they may appear to their peers to be playing up to the teacher, or may appear foolish if they seem to say a wrong or dumb thing. Student peer groups often expect students to listen with casual indifference, even with passive disdain. To expect students to become active classroom listeners is, therefore, to expect them to rise above the domination of the peer group. This is very difficult for most students.

The ideal English student, as you can see, is quite like the ideal learner in other areas of learning, in that critical reading, writing, and listening are required in virtually all subject areas. Yet the language arts are more central to education than perhaps any other area. Without command of one's native language, no significant learning can take place. Other domains of learning rely on this command. The ideal English student should therefore come close to being the ideal learner, and while helping our students to gain command of reading, writing, and listening we should see ourselves as laying the foundation for all thought and learning.

Meaning and Subjectivity

Usually, students treat the meanings of words as "subjective" and "mysterious". I have my meanings of words, and you have your meanings of them. On this view, problems of meaning are settled by asking people for their personal definitions. What do you mean by 'love', 'hate', 'democracy', 'friendship', etc.? Each of us is then expected to come forward with a "personal definition". My definition of love is this... My definition of friendship is that...

To persuade students that it is possible to use words precisely, we must demonstrate to them every word in the language had an established use with established implications that they must learn to respect. For example, consider the words 'rise', 'arise', 'spring', 'originate', 'derive', 'flow', 'issue',

22 of 25

'emanate', and 'stem'. They cannot be used however one pleases, according to a merely personal definition in mind. Each has different implications:

'Rise' and 'arise' both imply a coming into being, action, notice, etc., but 'rise' carries an added implication of ascent (empires rise and fall) and 'arise' is often used to indicate causal relationship (accidents arise from carelessness); 'spring' implies sudden emergence (weeds sprang up in the garden); 'originate' is used in indicating a definite source, beginning, or prime cause (psychoanalysis originated with Freud); 'derive' implies a proceeding or developing from something else that is the source (this word derives from the Latin 'flow' suggests a streaming from a source like water ("Praise God, from whom all blessings flow"); 'issue' suggests emergence through an outlet (not a word issued from his lips); 'emanate' implies the flowing forth from a source of something that is nonmaterial or intangible (rays of light emanating from the sun); 'stem' implies outgrowth as from a root or a main stalk (modern detective fiction stems from Poe).

Or consider the words 'contract', 'shrink', 'condense', 'compress', and 'deflate'. Each of them, too, has definite implications in use:

'Contract' implies a drawing together of surface or parts and a resultant decrease in size, bulk, or extent; to 'shrink' is to contract so as to be short of the normal or required length, amount, extent, etc. (those shirts have shrunk); 'condense' suggests reduction of something into a more compact or more dense form without loss of essential content (condensed milk); to 'compress' is to press or squeeze into a more compact, orderly form (a lifetime's work compressed into one volume); 'deflate' implies a reduction in size or bulk by the removal of air, gas, or in extended use, anything insubstantial (to deflate a balloon, one's ego, etc.)

There is a parallel insight necessary for understanding how to arrange sentences in logical relationships to each other. Our language provides a wide variety of adverbial phrases that can make connections between our sentences clearer. Here, as above, students need to learn and respect this established logic.

CONNECTIVES

- besides
- what's more
- furthermore
- moreover
- in addition
- for example
- for instance
- in other words
- therefore

HOW THEY ARE USED

- To add another thought
- To add an illustration or explanation
- To connect an idea with another one that

Richard Paul (1990)

23 of 25

CONNECTIVES consequently accordingly	HOW THEY ARE USED follows from it
of course to be sure although though	To grant an exception or limitation
still however on the other hand nevertheless rather	To connect two contrasting ideas
first next finally meanwhile later afterwards nearby eventually above beyond in front	To arrange ideas in order, time, or space
in short in brief to sum up in summary in conclusion	To sum up several ideas

Common Problems With Texts

A critical thinking approach to language arts instruction, with its emphasis on helping students understand the logic of what they study, can provide a strong unifying force in all of the basic dimensions of the language arts curriculum: reading, writing, language, grammar, and appreciation of literature. Unfortunately, this unifying stress is rare in language arts textbooks. Consequently, the emphases in reading, writing, language, grammar, and literature do not "add-up" for students. They don't recognize common denominators between reading and writing. They don't grasp how words in language have established uses and so can be used precisely or imprecisely,

clearly or vaguely. Their lack of understanding of the logic of language in turn undermines their clarity of thought when reading and writing.

Similarly, grammar seems to students to be nothing more than a set of arbitrary rules. Most texts take a didactic approach. They introduce principles or concepts, then provide drills. Specific skills are often torn from their proper contexts and practiced merely for the sake of practice. Yet, without context, skills have little or no meaning. An occasional simple reiteration of basic purposes or ideas is insufficient. Students need to see for themselves when, how, and why each skill is used specifically as it is.

Texts rarely even mention that most crucial distinction: well written versus poorly written. Students rarely, if ever, evaluate what they read. Students do not explore their standards for evaluating written material, or distinguish for themselves when a written work is clear or unclear, engaging or dull, profound or superficial, realistic or unrealistic, well-organized or disjointed, and so on.

Texts occasionally have a short lesson or activity on "describing plot", identifying themes, and "finding the main points. But students are rarely, if ever, called upon to describe the plots of selections they read. Yet these basic concepts are worthy of frequent discussion. Students should continually be required to describe the plot and state the theme of literature they read or state the main point of nonfiction passages.

Unfortunately, texts seldom have students examine work for themselves, discovering strengths and flaws, distinguishing main points from details, exploring the use of various techniques, formulating their conceptions of theses, plots, and themes.

SOME QUESTIONS TO RAISE ABOUT THE LOGIC OF LANGUAGE AND GRAMMAR

Keeping in mind the idea that language and grammar are, on the whole, logical, we should ask questions that help students discover this logic. Students should learn how to use grammatical distinctions, and why. For example, though students "cover" the distinction between transitive and intransitive verbs, they see no reason to make this distinction when they read or write. They should learn to supply implied objects of transitive verbs when they read or write. They should use grammatical analysis to help them read vague or difficult writing and to edit writing, not merely practice parsing sentences as drill.

"What is a sentence? How is it different from a group of words? What is a paragraph? How is it different from a group of sentences? What are words for? What do they do? How? How are words alike? Different? What kinds of words are there? How is each used? Why are some ways of using a word right and others wrong? What different kinds of sentences are there? When and how should each be used? Why follow the rules of grammar? How does

punctuation help the reader? How does knowing about grammar help me write? Read? When do I need to know this distinction or concept? How should I use it? How does knowing this help me as a writer? A reader? Why and how do different types of writing differ? What do they have in common?"

SOME QUESTIONS TO RAISE ABOUT THE LOGIC OF LITERATURE

Stories have their own logic. Events don't just happen. They make sense within the meanings and thinking of their authors. When we ask a question, there should be method to it. The questions should lead students to discover how to come to terms with the logic of the story. We should always have students support their answers by reference to passages in the story. It is not their particular answers that are of greatest importance, but rather how they support their answers with reasons and references to the story.

"What happened? Why? What is the author trying to convey? Why is this important? What is the main character like? How do you know? What parts of the book gave you that idea? What has shaped the main character? How has this person shaped others? Why do the characters experience their worlds as they do? How do those experiences relate to my experience or to those of people around me? How realistic are the characters? How consistent? If they aren't (realistic, consistent) why not? Is it a flaw in the work, or does it serve some purpose? What conflicts occur in the story? What is the nature of this conflict? What is its deeper meaning? What relationship does it have to my life? What meaning does that conflict have for the character? For me? Though the world, society, lifestyle, or characters are obviously different than what I know, what does this work tell me about my world, society, life, character, and the characters of those around me? What needs, desires, and ideas govern these characters? Can I identify with them? Should I? How does the view presented in this work relate to my view? To what extent do I accept the conception of humanity and society expressed or implicit in this work? To what extent or in what way is it misleading? How does it relate to conceptions I've found in other works? How good is this work?"

SOME QUESTIONS TO RAISE ABOUT THE LOGIC OF PERSUASIVE WRITING

Persuasive writing has a straightforward logic. In it, an author attempts to describe some dimension of real life and hopes to persuade us to take it seriously. We, as readers, need to grasp what is being said and judge whether it does make sense or in what way or to what degree it makes sense.

"What parts of this work do I seem to understand? What parts don't I understand? What, exactly, is the author trying to say? Why? How does the author support what is said with reasons, evidence, or experiences? What examples can I give to further illuminate these ideas? What counter-examples can I cite? How could the author respond to my counter-examples? What are

the basic parts of this work? How are the pieces organized? Which claims or ideas support which other claims or ideas? What beliefs does this claim presuppose? What does it imply? What are the consequences of believing or doing as the author says? What kind of writing is this? How has the writer attempted to achieve this purpose? Given that this is what I think is meant, how does this statement fit in? Could this be meant instead? Which of these interpretations makes more sense? How does the writer know what he or she claims to know? Have I good reason to accept these claims? Doubt them?"

How could I check, or better evaluate what it says? How are such questions settled, or such claims evaluated? What deeper meaning does this work have? What criticisms can I make? What is left out? Distorted? How are opponents addressed? Are these opponents represented fairly? Does the evidence support exactly the conclusions drawn? If not, am I sure I understand the conclusions and evidence? What is the source of the evidence? How should I evaluate it? What is left unexplained? What would the writer say about it? Of all the ideas or concepts, which is the most fundamental or basic? How are these concepts used? To what other concepts are they related? How does the writer's use of concepts relate to mine and to that of others? Should other concepts have been used instead? How can I reconcile what has been said with what others have said?"

SOME QUESTIONS TO ASK WHILE WRITING

Writing has a logic. Good substance poorly arranged loses most of its value. Whatever the principle of order chosen, thought must progress from somewhere to somewhere else. It must follow a definite direction, not ramble aimlessly. In the entire piece, as well as in section and paragraph, ideally, each sentence should have a place so plainly its own that it could not be shifted to another place without losing coherence. Remember, disorderly thinking produces disorderly writing, and, conversely, orderly thinking produces orderly writing.

"What do I want to communicate? Why? What am I talking about? What do I want to say about it? What else do I want to say about it and why? What else do I know or think about this? How is what I am saying like and unlike what others have said? What am I sure of? What questions do I have? What must I qualify? How can I divide my ideas into intelligible parts? What are the relationships between the parts? How can I show those relationships? How does this detail fit in? How does that claim illuminate my main point? What form of expression best gets this idea across? Would the reader accept this? What questions would the reader have? How can I answer those questions? If I word it this way, would the reader understand it the way I intended? How can I clarify my meaning? How could someone judge this idea

Richard Paul (1990)

or claim? How can it be supported? How would others refute it? Which of those criticisms should I take into account? How can I reconcile the criticisms with my ideas? How should I change what I've said? Will the support seem to the reader to justify the conclusion? Should I change the conclusion, or beef up the support? What counter-examples or problems would occur to the reader here? What do I want to say about them? How am I interpreting my sources? How would someone else interpret them? How can I adjust or support my interpretation? What implications do I want the reader to draw? How can I help the reader see that I mean this and not that? Which of all of the things I'm saying is the most important? How will the reader know which is most important? Why is this detail important? Have I assumed the reader knows something he or she may not know?"

CHAPTER 38: Critical Thinking and Science [515]

Students often mindlessly do their science work. We should look for opportunities that call upon them to explain or make intelligible what they are doing and why it is necessary or significant. When students perform experiments, we should ask questions such as these:

"What exactly are you doing? Why? What results do you expect? Why? Have you designed any controls for this experiments? (Why do you have to use the same amount of liquid for both tests? Why do these have to be the same temperature? Size? What would happen if they weren't?) What might happen if we _____ instead?"

When students make calculations or take measurements, we should ask questions like these:

"What are you measuring? Why? What will that tell you? What numbers do you need to record? In what units? Why? What equation are you using? Why? Which numbers go where in the equation? What does the answer tell you? What would a different answer mean?"

When studying anatomy, students can apply what they learn by considering such questions as these:

"If this part of the body has this function, what would happen if it no longer functioned fully or at all? Why do you say so? What would that be like for the person? What if it functioned on 'overdrive'? What other parts of the body would such breakdowns affect? Why?"

When students use theoretical concepts in biology or zoology, for example, they could be asked to explain the purpose and significance of those concepts by answering questions like these:

"How important is this distinction? Let's look at our chart of categories of living things. Where on the chart is this distinction? Why? What

25 of 25

distinction is more important? Why? Less important? Why? (Why is the distinction between vertebrates and invertebrates more important to zoologists than the distinction between warm-blooded and cold-blooded animals?)

"Did any categorizations surprise you or seem strange? Do zoologists group together animals that seem very different to you? Which? How can we find out why they are grouped this way?"

In general, students should be asked to explain the justification for scientific claims:

"Why does your text say this? How did scientists find this out? How would that prove this conclusion? Could we explain these results another way? What? Then how could we tell which was right? What would we have to do? Why? What results would you expect if this were so, rather than that hypothesis?"

Whenever possible, students should be encouraged to express their ideas and try to convince each other to adopt them. Having to listen to their fellow students' ideas, to take those ideas seriously, and to try to find ways to test those ideas with observations and experiments are necessary experiences. Having to listen to their fellow students' objections will facilitate the process of self-critique in a more fruitful way than if merely corrected by teachers who are typically taken as absolute authorities on "textbook" matters. Discussion with peers should be used to make reasoning from observation to conclusion explicit, help students learn how to state their own assumptions and to recognize the assumptions of others.