Critical Thinking: Basic Theory & Instructional Structures



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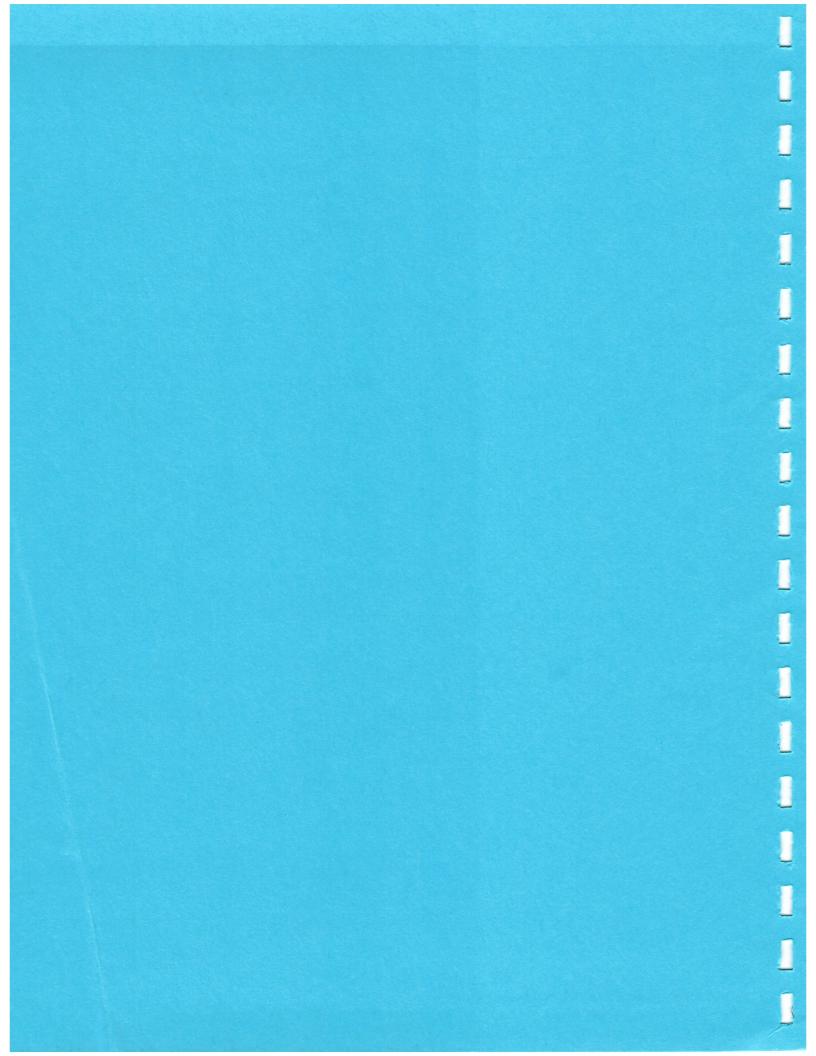


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Preface

Good Thinking is Practical

There is nothing more practical than sound thinking. No matter what your circumstance or what your aims, you are better off if your thinking is sound. As a shopper, teacher, student, business person, citizen, moral agent, lover, friend, parent---in every realm and circumstance of your life good thinking pays off. Poor thinking inevitably causes problems, wastes time and energy, and ensures frustration and pain.

Critical thinking is simply the art of ensuring that you use the best thinking you are capable of---in some set of circumstances and given your present limited knowledge and skill. However, to maximize the quality of your thinking, you must learn how to become a more effective "critic" of your thinking. And to become a more effective critic of one's thinking, one has to make learning about thinking a priority.

In other words, to become a better critic of my thinking, I have to become a better student of thinking. I must be willing to learn more about how thinking works and how to improve it. And I must be willing to put what I learn into practice. Improvement in thinking, in other words, is analogous to improvement in other domains of performance (in which different levels of quality are possible).

If you play tennis, and you want to play better, there is nothing more advantageous than to look at some films of excellent players in action and then compare how they address the ball in comparison to you. You study their performance. You study your performance. You note what you need to do more of, what you need to do less of, and you practice, practice, practice...

A similar set of points could be made for ballet, distance running, piano playing, chess, reading, writing, shopping, parenting, teaching, studying, etc... One major problem, however, is that thinking is invisible. We use it without explicitly noticing how we are using it. It is quite like the grammar we use when we speak. As native speakers of a language we use grammatical structures with virtually no sense that we are using them-unless, of course, we study grammar and then apply our study to our individual practice.

The Ideal Thinker

Much of the materials in this handbook highlight facts about thinking, and, by implication, about the ideal thinker. For example, when we understand that the ideal thinker is intellectually humble and hence is continually seeking to recognize the limitations of her knowledge, then we are more likely to recognize the importance of our recognizing the limitations of our own knowledge. When we recognize that the best thinkers are continually checking sources of information (for certain qualities of clarity, accuracy, and relevance), we are much more likely to begin to do so ourselves.

We use the concept of the ideal thinker simply as a tool. No human will ever actually think in an "ideal" way. Nevertheless, by understanding the ideal we can strive toward it, and hence improve. We use knowledge of the ideal, in other words, as a tool for thinking better.

Content As A Mode of Thinking

There is a particular set of performances we want in teaching content within a subject domain. We want significant concepts from the content to be internalized. We want students to leave our classes with the content of the course available to them in their minds, so that they can actually use the content in the "real" world. What does this have to do with thinking in general, and good thinking in particular? Everything.

Content is internalized by a mind, becomes available to a mind, becomes usable within a mind---only through thinking. When students think poorly while learning, they learn poorly. When they think well while learning, they learn well.

So if we are serious about wanting our students to internalize the content we teach and use it effectively in their lives, both academic and personal, then we should be very interested in their ability to think well.

For example, every student comes into your classes with some habits of thinking. Without some encouragement and help in learning to think as a critic of their thinking, the students will simply process the content of your course through their typical thinking. If rote memorization is the process they have come to use to "learn" content in the past, then they will use rote memorization in your course. Of course, rote memorization is not an effective way to think through content for understanding. The result is poor performance, poor learning, poor results.

A key insight into content (and simultaneously a key insight into thinking) is that all content represents typically a distinctive mode of thinking. Math becomes easier and easier as one learns to THINK mathematically. Biology becomes easier and easier as one learns to THINK biologically. History becomes easier and easier as one learns to THINK historically.

Hence, one of the most practical things we can do as teachers is to present our content up-front as a mode of thinking. We tell the students immediately on the first class day that thinking through the content is the key agenda item in the course.

"This is a geography course and therefore the key goal is to learn to think geographically. Let's begin with a clear idea of what is at the heart of geographical thinking and, once you have that idea in place, we will begin the process of practicing geographical thinking. Each day in class you will be expect to do some geographical thinking..."

Learning Practical Strategies For Engaging Student Thinking

What we do then is use a series of practical strategies to engage the students in the thinking we want. We model that thinking in front of them, and, most importantly, hold them responsible for assessing their thinking (under our direction and supervision). They do the practice; we do the supervision. They do the assessment; we show them how, check on them, and provide ways to guarantee that the quality we want is there, without being bogged down with extensive grading.

Conclusion: Practicing What We Preach

One of the most important things which we can do for our students is to help them to begin the process of becoming a "critic" of their thinking. To do this we have to help them to "discover" their thinking and to discover that, potentially at least, they can make radical changes in their thinking. They need to learn about their "bad" habits of thought and about what they are striving for (ideal habits of thought). At whatever level they think, they need to recognize that they can learn to think better.

Quite ironically, most of us got through school developing our thinking the "hard" way: through trial and error. Most of us had little help in learning how to become a critic of our thinking. The result is that we used our native capacities to think in a largely intuitive fashion. We developed some good habits of thought; we developed some bad habits of thought. And now the good and bad are intermixed and hard to disentangle. We learned without a clear sense of the "ideal" in thinking. We were not clear about what we were aiming at, as thinkers. Each class we took probably seemed more like a new set of tasks, than intimately connected to other classes.

We want our students to have more leverage on learning. We want them to have a clearer perspective on what they should be striving to achieve.

It is useful, therefore, to think of teaching as a mode of mutual learning. We discover as our students discover. We improve as they do.

Remember, good thinking works. It is practical. It enables us to be more successful, to save time and energy, and experience more positive and fulfilling emotions. It is in our interest to become a better critic of our own thinking: as teachers, scholars, parents, etc...

The result is that as we help the student improve their thinking, we improve our own. As we help them to discover their thinking, we "discover" our own. As we help our students become critics of their thinking, we become better critics of our own. As we help students transfer their classroom learning to the real world of their everyday lives, we give examples from our own transfer, and hence, enhance that transfer for ourselves as well as them.

Good thinking works. For students. For Us. For everyone.

What is Critical Thinking?

Though there are many candidate "definitions" of critical thinking in the literature, there are some common threads of emphasis that run through most of those definitions, among them the following:

- 1) that critical thinking enables thinkers proficient in it to better produce and assess intellectual work as well as to act more "reasonably" and "effectively" in the world of affairs and personal life;
- 2) that the possibility of assessing intellectual work and action in the world requires intellectual standards essential to sound reasoning and personal and professional judgment;
- 3) that self-assessment is an integral dimension of such reasoning and judgment;
- 4) that as one learns to think critically one is better able to master content in diverse disciplines;
- 5) that critical thinking is essential to and made manifest in all academic disciplines, including sound reasoning and expert performance in such diverse fields as biology, chemistry, mathematics, sociology, history, anthropology, literature, philosophy, as well as in all of the arts and professions;
- 6) that as one becomes proficient in critical thinking one becomes more proficient in using and assessing goals and purposes, questions and problems, information and data, conclusions and interpretations, concepts and theoretical constructs, assumptions and presuppositions, implications and consequences, and points of view and frames of reference;
- 7) that mastery of language contributes to critical thinking;
- 8) that as one becomes more proficient in critical thinking one improves one's capacity to think more clearly, more accurately, more precisely, more relevantly, more deeply, more broadly, and more logically;
- 9) that as one becomes more proficient in critical thinking one becomes more intellectually perseverant, more intellectually responsible, more intellectually disciplined, more intellectually humble, more intellectually empathic, and more intellectually productive;
- 10) that as one becomes more proficient in critical thinking one becomes a better reader, writer, speaker, and listener;
- 11) that proficiency in critical thinking is integral to lifelong learning and the capacity to deal effectively with a world of accelerating change.

What is the relationship between critical thinking and problem solving?

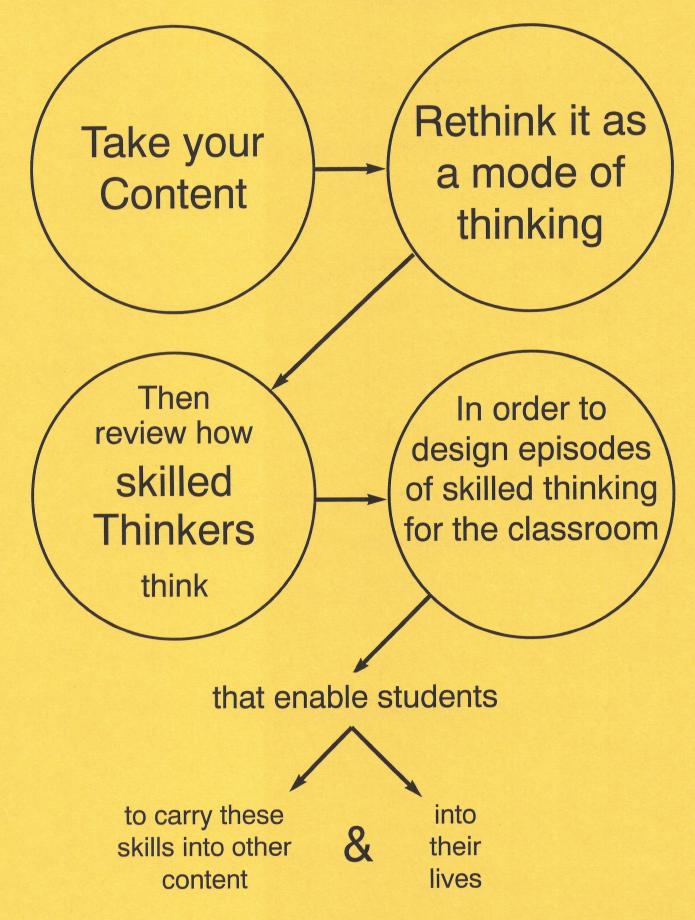
We understand critical thinking and problem solving to be related in the following ways:

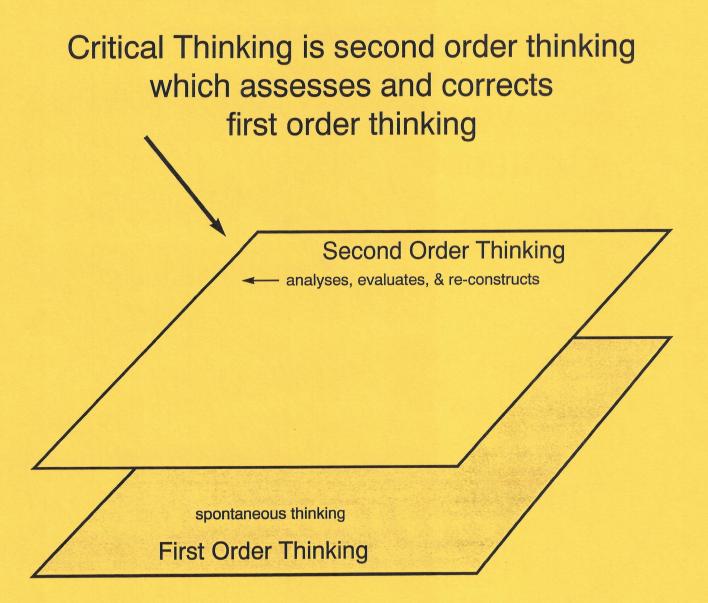
- 1) that problem solving requires critical thinking (it would make no sense to be an "uncritical" problem solver nor to think that uncritical thinking is effective in the solution of problems);
- 2) well-conceived critical thinking invariably contributes to the solution of problems (it would make little sense to say, "I need to think critically, but I have no problems that I need to solve);
- 3) that all of the ten points made above with respect to critical thinking can be made with minor adjustments for problem solving, and hence
- 4) that problem solving is a major use of critical thinking and critical thinking a major tool in problem solving (and therefore that the two are best treated in conjunction rather than in disjunction).

Teaching For Critical Thinking

Given the characterizations above, it is clear that exemplary practices in program design, course design (including model syllabi), assessment of teaching for critical thinking, and teaching strategies (including model assignments, tests, and assessment tools, including those which facilitate student self-assessment using criteria for sound critical thinking) should have features that make plausible the cultivation of critical thinking and problem solving in the senses above. They should:

- 1) help students to better produce and assess intellectual work as well as act more "reasonably" and "effectively" in the world of affairs and personal life;
- 2) help students assess their work and action using intellectual standards essential to sound reasoning and personal and professional judgment;
- 3) foster self-assessment in their reasoning and exercise of judgment;
- 4) help students master content more proficiently in diverse disciplines and settings;
- 5) help students exercise more skilled and proficient reasoning and problem solving in a diversity of fields;
- 6) help students to become more proficient in using and assessing goals and purposes, questions and problems, information and data, conclusions and interpretations, concepts and theoretical constructs, assumptions and presuppositions, implications and consequences, and points of view and frames of reference (in the posing and solving of problems, as well as in the asking and answering of questions and the resolving of issues);
- 7) help students to achieve higher levels in the mastery of language and communication;
- 8) help students think more clearly, more accurately, more precisely, more relevantly, more deeply, more broadly, and more logically;
- 9) help students become more intellectually perseverant, more intellectually responsible, more intellectually disciplined, more intellectually humble, more intellectually empathic, and more intellectually productive;
- 10) help students become better readers, writers, speakers, and listeners;
- 11) help students to become lifelong learners with more of the capacity to deal effectively with a world of accelerating change





Whenever we think

in attempting to answer a <u>question</u>, solve a <u>problem</u>, or resolve an <u>issue</u>. We think for a purpose

based on concepts and theories

within a point of view

to make inferences and judgments

based on assumptions

We use data, facts, and experiences

leading to implications and consequences.

Fundamentals About Our Workshop

The basic goal of all of our workshops is to help educators design instructions so that students master content in a deep and thoughtful way. We assume that all persons learn best when they use their own thinking as a major tool of learning. We therefore show how the content of any class is best understood as a mode of thinking. We show how all the plans one comes up with for teaching a class can become embodied in the structure of the class. We show how all structures, no matter how well they are designed, entail practical problems of implementation that require one to devise some tactics to minimize those problems.

We help participants, first, to reconceptualize their content as a mode of thinking, and then to design structures and tactics that help students to learn content in that way. The result is that students learn to think in a new way about their own learning.

Learning To Teach Content as a Mode of Thinking

We teach participants how to reconceptualize why their content is best understood, not as a collection of sentences to memorize, but as a mode of thinking (for example, why the content of Biology is best understood to be biological thinking; why the content of History is best understood to be historical thinking; why the content of Geography is best understood to be geographical thinking.)

Learning To Design Structures To Facilitate Thinking

We then illustrate how everything one learns about thinking can be used to more effectively plan out the structures that are useful in teaching content. If all thinking is grounded in a purpose, then it will be useful to design instruction so that students grasp the purpose inherent in it. If all thinking presupposes access to information, then it will be important to decide how students are going to get the information that is central to the content of the course. If all thinking has implications, then it is important that students reflect on the implications of the thinking that is presented to them, as well as the thinking that they themselves generate.

Learning To Devise Tactics That Improve the Effectiveness of Instruction

No matter how well we structure our classes, problems are bound to emerge in our day to day instruction. It is important, therefore, that we become used to thinking tactically about our instruction. Consequently, we teach participant instructors techniques that can be used to enhance their tactical thinking in any given class.

For example, if I find that students are not listening to what other students say, I can use the tactic of calling on students to summarize what other students have said. If I find that many students are not clarifying in their own minds the question being discussed (and hence wander off the topic), I can randomly call on students to state the question on the floor.

We Use "Demonstration Teaching" as a Main Teaching Tool In Our Workshops

To maximize the effectiveness of our workshops we use "demonstration teaching" as a key teaching strategy. In other words, we model the very principles of instruction we are recommending in the way we design and conduct the workshop. As a result, participants not only receive a good start in rethinking their own instruction, they take away a lived experience of what it is to be in a "class" that is fostering critical thinking.

The Basic Concepts Once Again: Content, Structure, Tactics

The content for a course includes everything we want students to learn as a result of our instruction. The structure of a course includes everything we design into a course when we plan out exactly how we will teach it. The tactics of a course include everything we do to minimize problems that emerge as a result of student reaction to our instruction.

Of course, since all structures are designed to "work" in some way, they all have a tactical feature to them. The shape of a screwdriver, for example, is the result of someone's thinking through the job that the screwdriver has to do. Nevertheless, irrespective of the functionality of any given design, adjustments will have to be made in the light of specific problems of application.

It is often possible to anticipate some problems of application and then to design "solutions" into the structure. For example, the problem of rust in nails was solved by galvanizing the nails in the manufacturing process.

In teaching, it is not possible to pre-design all "solutions" to problems of learning into the structure of our classes. In fact, there are some insoluble problems of teaching built into the nature of teaching and learning. For one, students come to classes with a variety of degrees of readiness to learn. They vary significantly from "eager and well-prepared" students to "hostile and illiterate" students. For another, each class develops a unique and unpredictable dynamism resulting from the particular combination of individuals in the class (along with other factors). It is not possible to predict the specific problems that may arise within any given class.

Consequently, we must develop a repertoire of tactics which allow us to make needed adjustments as we assess the effectiveness of our instruction.

Reconceptualizing "Content" as a Mode of Thinking:

To teach for critical thinking effectively within any given subject requires that we re-think every dimension of what we want the students to learn. We must move from thinking of content as stuff to remember to learning as a mode of thinking and acting. For example, if we want nursing students to take a course in anatomy, we must ask ourselves how anatomical thinking is essential to the professional thinking of a nurse. If we are going to require students to take courses in history, we have to think through how historical thinking is essential to the daily and professional thinking of our students.

Structural Thinking: What is Included in the Structure of Any Course?

In structurally designing any given class to foster critical thinking, there are a number of potential problem areas (and hence a number of different functions) we need to take into account. We divide these into two dimensions.

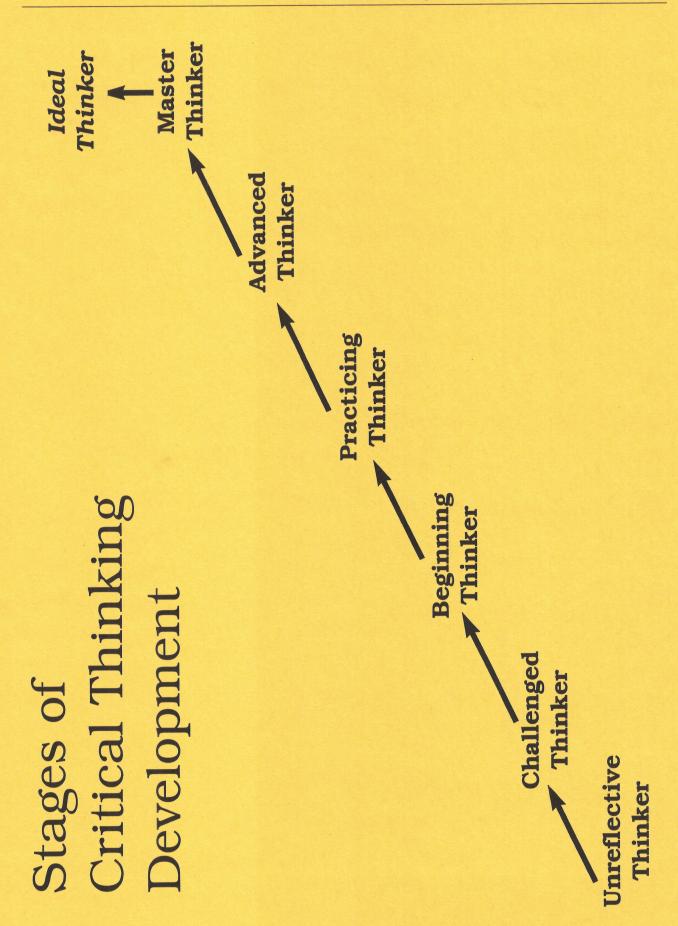
- 1) Developing a Unified Concept For a Course: Once we are clear about how any content can be understood as a mode of thinking, we can then use the facilitation of that mode of thinking as the central organizing concept for our teaching. We can then provide our students with a general "test" of their participation in the class: "At any moment of instruction, randomly chosen, we can say "Are you thinking (historically, biologically, geographically, etc...) or are you merely passively taking notes, staring out the window, or vaguely following what the lecturer is saying?"
- 2) Developing a General Plan For a Course: Once we have settled upon an organizing concept for our course,
 - · we can focus on a general plan for the course.
 - · We can plan out how we are going to sequence instruction.
 - We can plan out the patterns of a typical day.

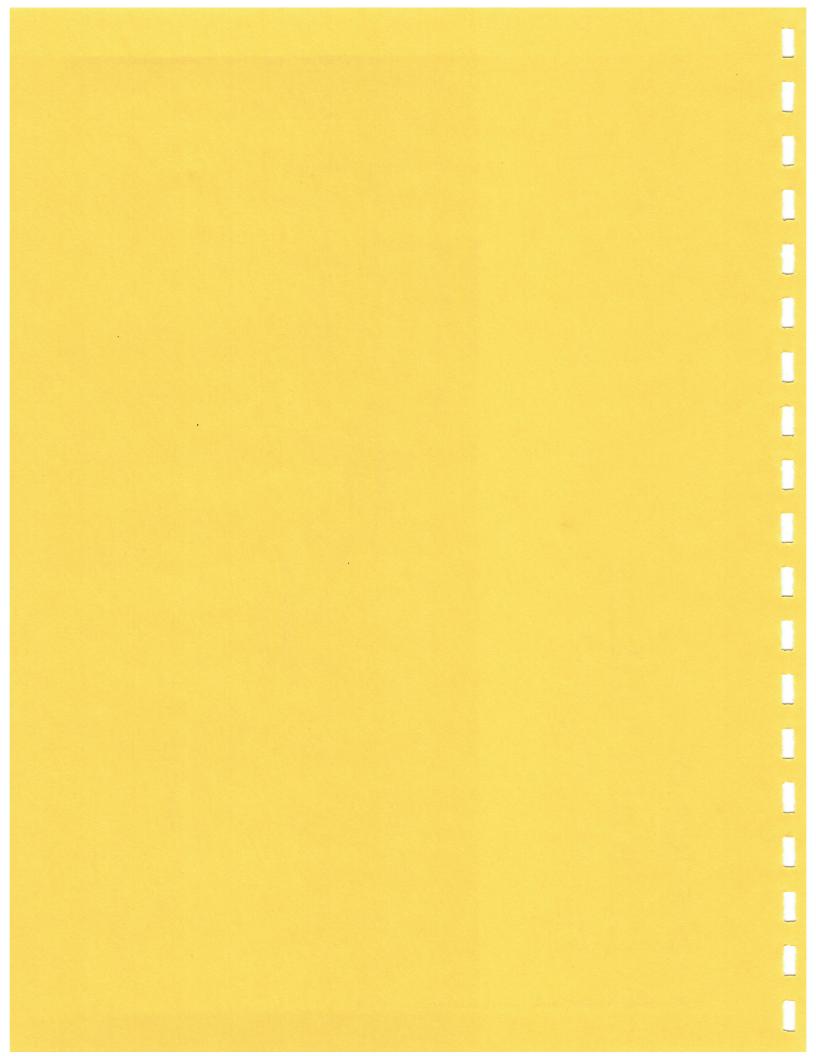
- We can decide on the most important components of the kind of thinking we intent to cultivate and then figure out how we are going to put an emphasis on that component into our course.
- · We can decide on student requirements and responsibilities.
- · We can decide on our grading policy.
- · We can develop performance profiles.
- We can plan out how we are going to orient the student to the ground-rules of the class.

Each of these decisions, once made, is part of the "structure" of the course.

Tactical Thinking: Responding Day by Day to Problems in Instruction

The tactical dimension of redesigning instruction is the development of ways and means to minimize problems that emerge in instruction within some given structural plan. It is always a form of problem-solving. It always involves making adjustments in our instruction that result from the fact that something needs correction in the classroom. When we design a class we usually try to anticipate problems. But there are always problems that occur despite our planning. Those problems we must try to solve on the spot, as it were. We can be best prepared for these problems if we have a repertoire of tactics available to us.





Part One

The Affective Dimension

Teaching, the Human Mind, and the Emotional Lives of Students

Humans Live in a Special Relationship to Their Minds

Everyone lives in a special and intimate relationship to his or her mind. Much of our activity is centered on inward ideas of who we are, what we are, what we are experiencing (from moment to moment), where we are going (our future), where we have come from (our past), and a host of emotions and feelings about all of these (that disclose their positive or negative value).

We experience joy, happiness, frustration, pain, confusion, desire, passion, indifference, because we give a special meaning to the situation, because we think about it in a particular fashion, because we connect it to feelings we experienced in similar or related circumstances. That meaning can be grounded in objective reality or in a dysfunctional interpretation of reality. For example, two people in the same situation may react completely differently, with one person experiencing pain and frustration while the other experiences curiosity and excitement. Consider two students faced with the task of improving their writing ability. The first may experience difficulty, confusion, frustration, and ultimately give up. This person gives a negative meaning to the task of learning to improve writing, defining it as a situation destined for failure.

On the other hand, another person in the same situation may experience it as a challenge, as exciting, even exhibitant, not because she possesses skills in writing the other does not, but rather because she brings a different mind set to the task.

The learning challenge or the actual task at hand, as it exists in reality, is precisely the same; nevertheless the difficulty or ease with which a person handles the challenge, the decision to take up the challenge or avoid it altogether, ultimate success or failure, is determined fundamentally by the manner in which the situation is interpreted. Different emotions follow from these differences in thought and action.

The Mind has Three Functions

The mind has three basic functions: thinking, feeling, and wanting. The process of thinking creates meaning (making sense of the events of our lives thereby). The process of feeling monitors those meanings (evaluating how positive and negative the events of our lives are, given the meaning we are ascribing to them). The process of wanting drives us to act (in keeping with our definitions of what is desirable and possible). What is more, there is an intimate interrelation between thinking, feeling, and wanting. When, for example, we THINK we are being threatened, we FEEL fear, and we inevitably WANT to flee from or attack that which we think is threatening us. When students THINK a subject they are required to study has no relationship to their lives and values, they FEEL bored by instruction in it, and develop a negative MOTIVATION with respect to it.

Instruction that fails to address the affective side of students' lives can eventually turn students into inveterate "enemies" of education. For example, students who are force-fed math in a way that ignores student emotions typically end up with a bad case of "math hatred." For the rest of their lives they avoid anything mathematical. They view mathematics as unintelligible, "just a bunch of formulas," unrelated to anything important in their lives.

Student Thinking is Initially Highly Egocentric

One of the fundamental problems most students face in learning is that their cognitive and affective life are dominated by egocentrism. Their lives are deeply situated in their own desires, pains, thoughts, and feelings. Many of their basic meanings have come from their peer group or the media. They seek immediate gratifica-

tion (or long-term gratification based on an essentially selfish perspective). They are not fundamentally concerned with whether or not their perceptions or meanings are "accurate." They are not significantly concerned with personal growth, self-insight, or ultimate integrity (though of course they think they are). They are not deeply motivated to discover their own weaknesses, prejudices, or self-deception.

The tendency for students to think in an egocentric fashion provides a special challenge to us, for egocentric thinkers have no real insight into the nature of their own thinking and emotions. For example, without really knowing it, many students inwardly believe that it is possible to acquire knowledge without thought, that it is possible to read without exerting any intellectual energy, and that good writing is not a product of practice and hard work but of a talent one is born with. As a result, they are not inclined to take any responsibility for their own learning or to put any effort into learning new modes of thinking. Much of their thinking is stereotypical and simplistic, yet their egocentrism prevents them from recognizing this.

Most Academic Subjects and Modes of Discourse Seem Foreign and Unconnected to Students' Lives and Problems

Our challenge is to design our classes to break through to the emotional and affective lives of our students, and to help them overcome their egocentrism. We must design instruction so that students discover the power of the modes of thinking that academic disciplines create and define. Students need to discover that there is such a thing as non-egocentric thought, that one can not only aspire to it, but develop powerful affect in pursuit of it. Students need to discover that (non-egocentric) historical thought frees us from the egocentric stories we tend to build our lives upon, that (non-egocentric) sociological thought frees us from the domination of peer groups, that (non-egocentric) philosophical thought frees us to reason comprehensively about the direction and values embedded in our lives, that (non-egocentric) economic thought enables us to grasp powerful forces that are defining the world we are inhabiting.

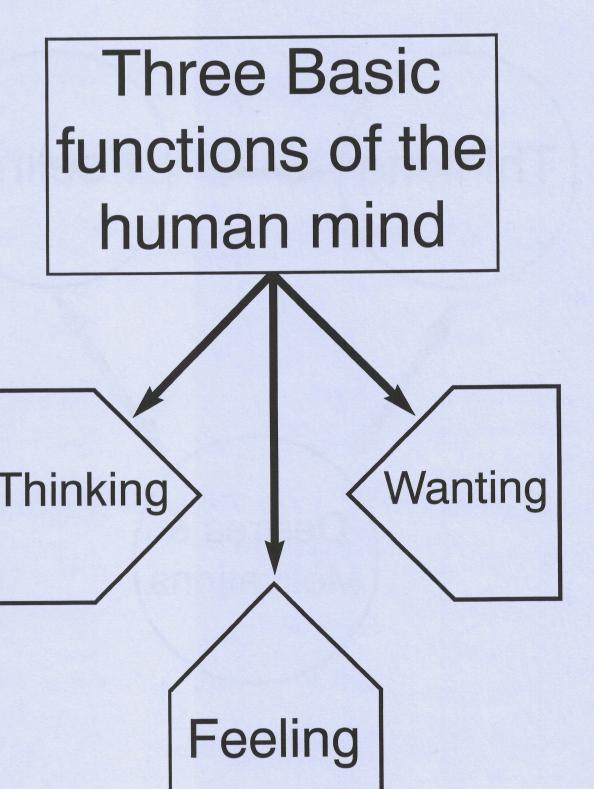
Designing a Class is Both a Cognitive and an Affective Task

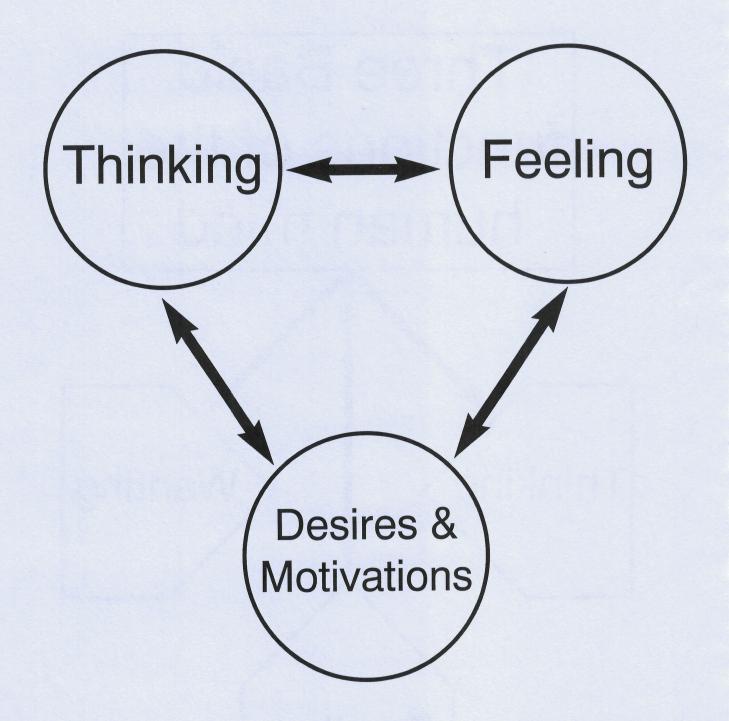
What we need to see, then, is that students (like all of us) spend most of their time thinking about what they personally value. Their emotional life keeps them focused on the extent to which they are "successfully" achieving their personal values—as measured by their personal thinking. The subjects we teach contribute to the educational transformation of students only insofar as we are able to stimulate students to grasp the relevance of what they are studying to their personal life. If a student is personally to value literature—and hence to read it unmotivated by a class or a grade—that student must discover the relevance of literary insights to the "story" that his own life represents. Of course, the egocentric way in which students live within a "story" (that their own subconscious mind is creating) is not something they easily grasp. There are many defense mechanisms that they use to resist discovering their own (egocentric) thoughts and emotions, defense mechanisms that keep them from growing intellectually. It is as if the thoughts and emotions that run their lives were unknown to them.

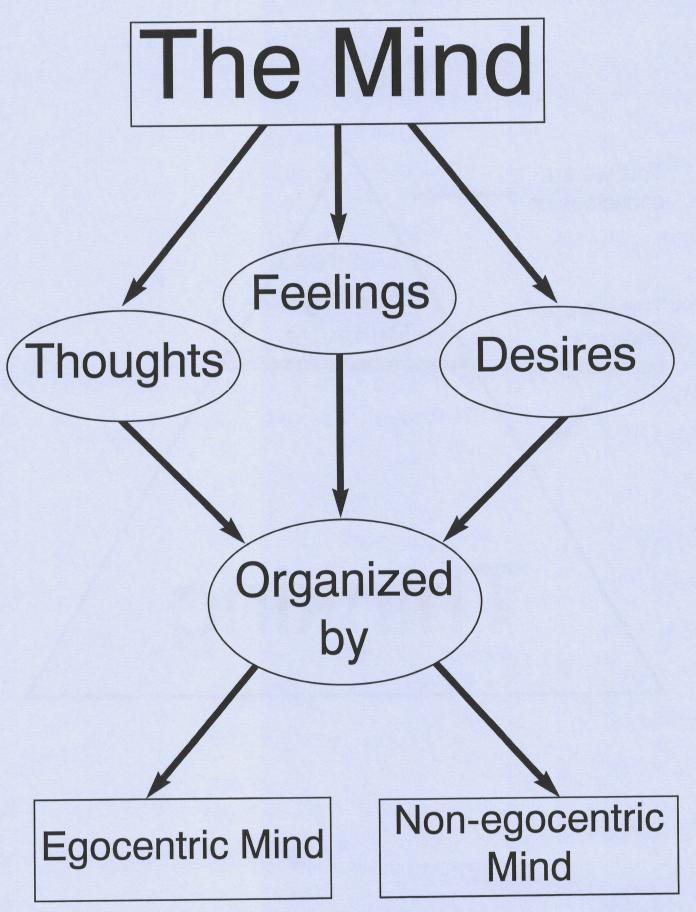
Each academic discipline represents a powerful mode of thinking that can transform minds, but only if those minds open to them, only if those minds take them on, re-create them inwardly and personally. In some sense, all knowledge is personal, since no knowledge would exist without persons to have that knowledge. In the long run, we acquire only the knowledge we value. We internalize only those modes of thinking that seem essential to what we want and esteem.

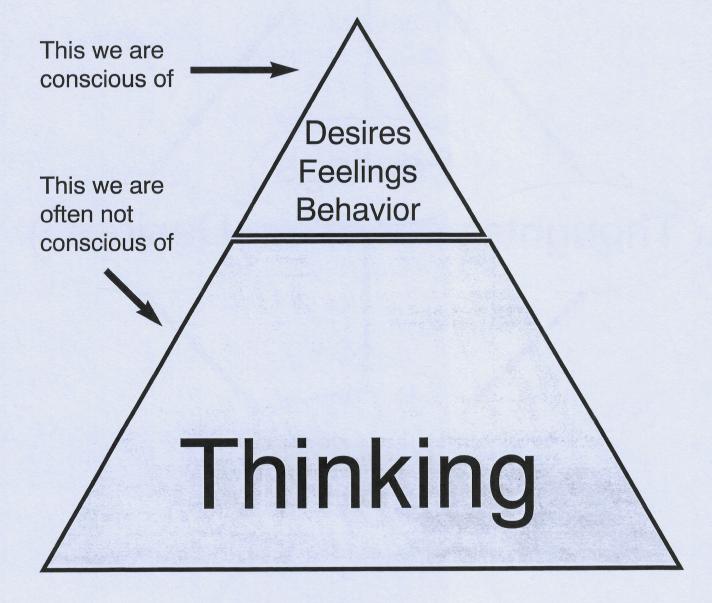
How, then, are we to design instruction with these ends and problems in view?

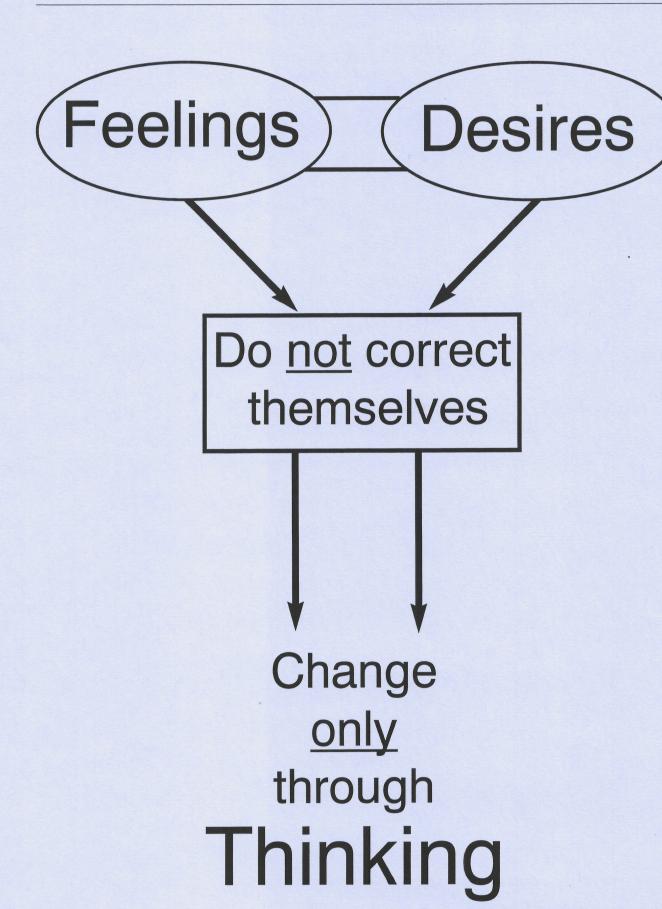
As humans we live in our MINGS

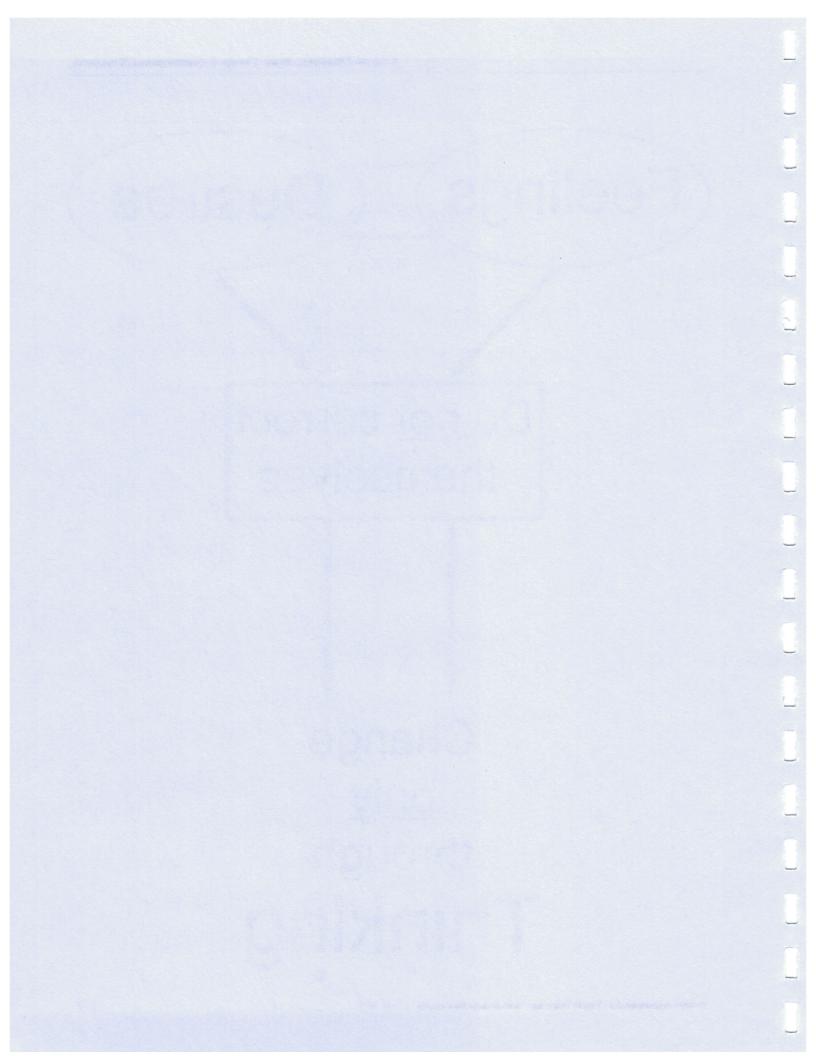












Part Two

Learning to Teach Content as a Mode of Thinking

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Learning To Teach Content As A Mode Of Thinking

All of the material in this segment of the workshop handouts deals with the nature of critical thinking. Since we are approaching all content as a way of thinking, each of the concepts delineated in this section has an important relation to our content and hence to how we structure our courses. For example, once we discover that there are "universal" criteria appropriate to the assessment of all thinking—for example, clarity, accuracy, precision, relevance, consistency...—we are then ready to figure out how we are going to structure an appropriate emphasis on these basic standards into our courses.

In this section, we focus on getting clear on the nature of critical thinking, of the parts of thinking, of the standards for thinking, of the abilities of thinking, and the traits of a well-reasoning mind. We do not focus on how to design these understandings into the structure of our courses. We leave that problem to Part Three.

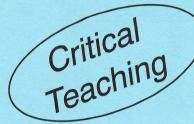
Didactic Teaching

Coverage that smothers thinking, a kind of death instinct in teaching

Students are taught content in a form that renders them unlikely to think it through

The mind retreats into rote memorization.

Abandons any attempt to grasp the logic of the content.



Content→

as something that is alive only in minds

as a mode of thinking driven by questions

the content is <u>regenerated</u> in the mind of the student <u>through thinking</u>

the content is understood as moments or <u>dimensions of a thinking</u> process

the content cannot be completed because it "lives" in thinking

the thinking that underlies content continually generates further content

its purposes
its questions
its concepts

further purposes
further questions
further concepts

Educators who think Critically...

- → Want their "content" to TAKE ROOT in the thinking of the students.
- → To LIVE in the minds of students.
- → To TRANSFORM the way they think.
- → To put them into possession of a new MODE OF THINKING.
- → To become a perpetual GENERATOR of NEW THOUGHTS, understandings, & beliefs.
- → To become an <u>INSTRUMENT</u> of <u>INSIGHT</u>.

And therefore they design instruction with these ends continually in view

So that students <u>TAKE CHARGE</u> of their <u>THINKING</u> & continually upgrade it.

- All content "lives" in the form of thinking.
- Only those who can "think" through the content, have it.
- All content "dies" when one tries to learn it without thinking it through.
- Only through thinking can students "take possession" of content & make it theirs.
- Only to the extent that a student asks genuine questions & seeks answers to them, is a student taking content seriously and thinking it through!

"A man may hear a thousand lectures, and read a thousand volumes, and be at the end of the process very much where he was, as regards knowledge. Something more than merely admitting it in a negative way into the mind is necessary, if it is to remain there. It must not be passively received, but actually and actively entered into, embraced, mastered. The mind must go half-way to meet what comes to it from without."

- John Henry Newman, 1852 The Idea of a University

Content is Thinking: Thinking is Content

A foundation for the Logic of Teaching

The first and most important insight necessary for the appropriate design of instruction and curriculum is that content is, in the last analysis, nothing more nor less than a mode of thinking. Let me explain.

Historical content is a manifestation of historical thinking. Biological content is a manifestation of biological thinking. Algebraic content is a manifestation of algebraic thinking. There are many ways to begin to grasp the profound truth that all content is nothing more nor less than a mode of thinking, a way of figuring something out, a way of understanding something through thought. Here are just three ways of beginning to grasp this truth:

1) All "content" in school is content in a subject.

All subjects are areas of study. All areas of study are "things" that we are interested in "figuring out." All fields of study have been advanced insofar as we have discovered ways to figure out whatever is being studied. There is no way to figure out something without thinking. There is no way to learn how to figure something out without learning how to think it through. There is no way to learn mathematical content without learning how to figure out correct answers to mathematical questions and problems. There is no way to learn historical content without learning how to figure out correct or reasonable answers to historical questions and problems. There is no way to learn biological content without learning how to figure out answers to biological questions and problems. Any subject or "content area" can therefore be understood as a mode of figuring out correct or reasonable answers to a certain body of questions. We study chemistry to figure out chemicals (to answer questions about chemicals). We study psychology to figure out human behavior (to answer questions about certain human problems). All subjects can be understood only in this way.

2) All "content" involves concepts.

There is no way to learn a body of content without learning the concepts which define and structure it. There is no way to learn a concept without learning how to use it in thinking something through. Hence, to learn the concept of democracy is to learn how to figure out whether some group is functioning democratically or not. To learn the concept of fair play is to learn how to figure out whether someone is being fair in the manner in which they are participating in a game. To learn the concept of a novel is to learn how to distinguish a novel from a play or short story. To learn the concept of a family is to learn how to distinguish a family from a gang or club. To learn any body of content, therefore, it is necessary to learn to think accurately and reasonably with the concepts that define the content.

3) All "content" is logically interdependent.

To understand one part of some content requires that we figure out its relation to other parts of that content. For example, we understand what a scientific experiment is only when we understand what a scientific theory is. We understand what a scientific theory is only when we understand what a scientific hypothesis is. We understand what a scientific hypothesis is only when we understand what a scientific prediction is. We understand what a scientific prediction is only when we understand what it is to scientifically test a view. We understand what it is to scientifically test a view only when we understand what a scientific experiment is, etc. To learn any body of content, therefore, is to figure out (i.e., reason or think through) the connections between the parts of that content. There is no learning of the content without this thinking process.

The majority of teachers and students currently approach content, not as a mode of thinking, not as a system for thought, nor even as a system of thought, but rather as a sequence of stuff to be routinely "covered" and committed to memory. When content is approached in this lower order way, there is no basis for intellectual growth, there are no deep structures of knowledge formed, no basis for long term grasp and control.

Critical thinking, in contrast, approaches all content explicitly as thinking. It takes thinking apart. It weaves new thinking into old. It assesses thinking. It applies thinking. It is thinking about thinking while thinking in order to make thinking better: more clear, more accurate, more relevant, more deep, more broad, and more effective.v

If It's True of All Thinking, Is it True of the Thinking You Are Teaching?

If teaching any content well involves teaching it as a mode of thinking, then everything we can discover about all thinking is a potential insight into how we should design our instruction. For example:

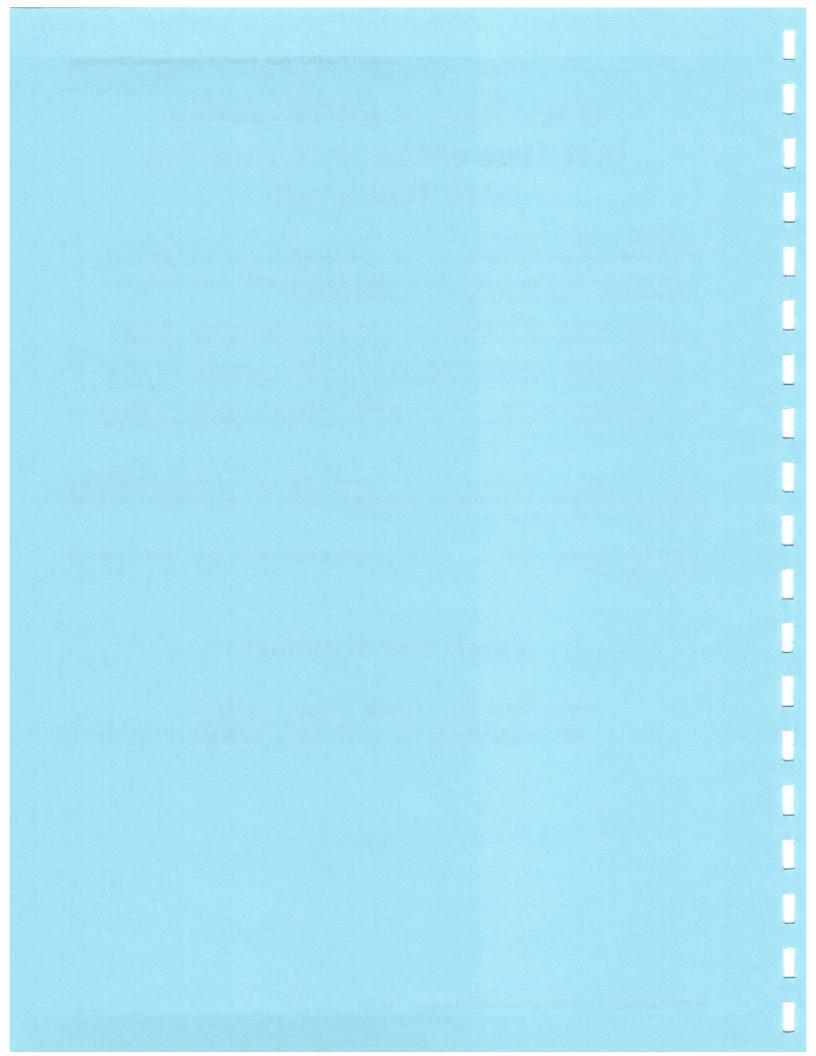
- 1) If all thinking is thinking for a purpose, then I can ask myself, "Am I designing my instruction so that students have to think through the purpose of what they are doing?"
- 2) If all thinking requires information, then I can ask myself, "Am I designing my instruction so that students have reasonable access to the information they need to learn what I want them to learn?"
- 3) If all sound thinking requires criteria to assess it's soundness, then I can ask myself, "Am I designing my instruction so that students learn criteria they need to assess their own thinking?"
- 4) If all sound thinking is focused on a question or problem, then I can ask myself, "Am I designing my instruction so that students learn how to focus their thinking on well-formulated questions or problems?"

All of the material that follows in this section is designed to highlight some feature of thinking that is true of all thinking or all sound thinking. It can be used, therefore, as a way of looking at the design of our instruction. We simply ask the following question,

"If all sound thinking involves _____, am I designing my instruction so that students learn to think in this way?"

Check Your Teaching!

Are You Teaching Your Content as a Skilled Way of Thinking?

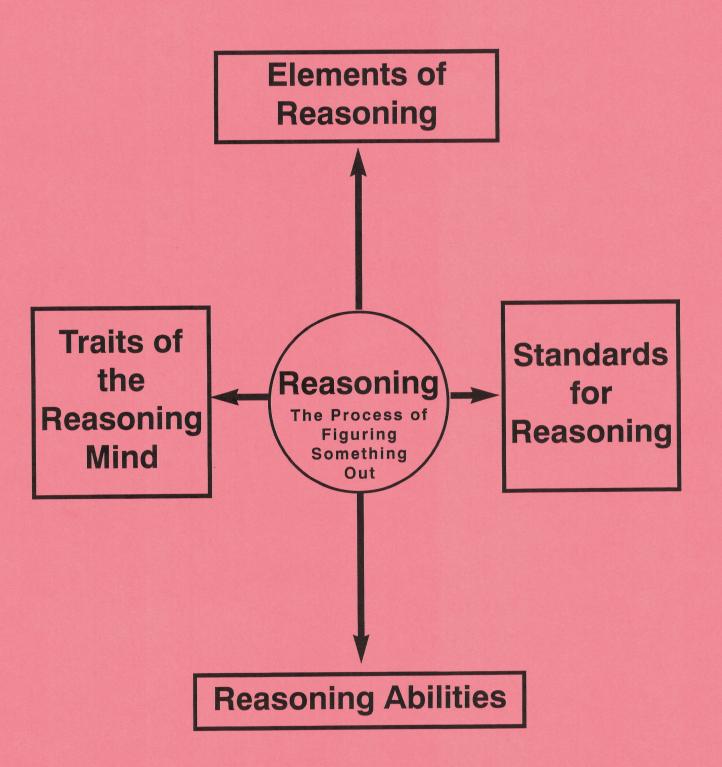


Part Three

Learning the Fundamentals of Critical Thinking

Reasoning

There are four aspects of reasoning



What is Reasoning?

Reasoning is drawing conclusions on the basis of reasons.

Designing Instruction: we want to design instruction so as to engage the students in reasoning about whatever they are studying and we want our students to become better and better at reasoning.

One can draw conclusions about poems, microbes, people, numbers, historical events, social settings, psychological states, everyday situations, character traits, indeed, about anything whatsoever.

What makes good reasoning good reasoning?

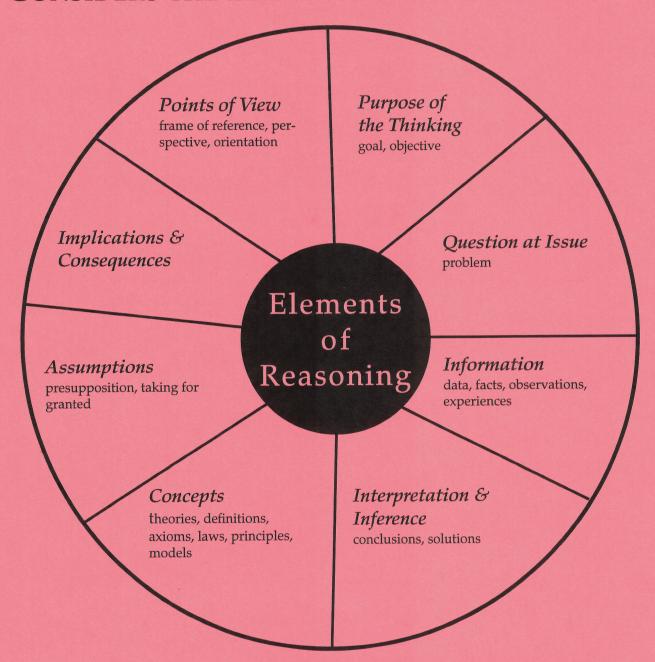
To become adept at drawing justifiable conclusions on the basis of good reasons is more complex than it appears, for drawing a conclusion is always the tip of an intellectual iceberg. There is much more that is implicit than is explicit in reasoning, more components that we do not express than those we do. To become skilled in good reasoning we must become practiced in making what is implicit explicit so that we can "check out" what's going on "beneath the surface" of our thought.

When you draw conclusion, you do so in some circumstances, making some inferences (that have implications and consequences) based on some reasons or information (and assumptions) using some concepts, in trying to settle some question (or solve some problem) for some purpose within some point of view.

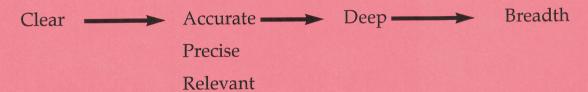
Ideal reasoners can re-construct and plausibly assess any of the elements as they function in their reasoning.

A CRITICAL THINKER

CONSIDERS THE ELEMENTS OF REASONING



WITH SENSITIVITY TO UNIVERSAL INTELLECTUAL STANDARDS



Elements

Purpose Interpretations

Assumptions Concepts

Question at Issue Points of View

Problem to be Solved Information

Inferences Consequences & Implications

Traits

Independent Thinking
Intellectual Empathy
Intellectual Humility
Intellectual Courage
Intellectual Integrity
Intellectual Perseverance
Faith in Reason
Intellectual Curiosity
Intellectual Civility
Intellectual Responsibility

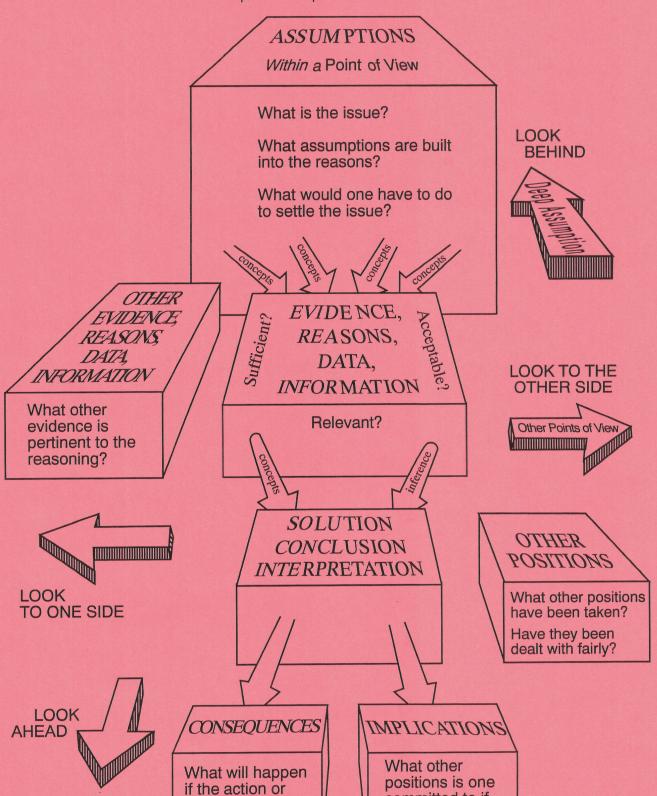
REASONING Standards Clear Accurate Precise Relevant Deep Breadth

Abilities

ı	Process	Object	Standard
	identifying -	purposes	clearly
	analyzing —	problems	accurately
	evaluating>	interpretations -	precisely
	analyze —	concepts	deeply
	evaluate	assumptions -	accurately
	analyze	points of views -	deeply
	evaluate	implications -	thoroughly

The Elements of Reasoning Within a Point of View

Adapted from Ralph H. Johnson and J. A. Blair



policy is

implemented?

committed to if

one accepts the

conclusion?

Using Intellectual Standards to Assess Student Reasoning

To assess student reasoning requires that we focus our attention as teachers on two inter-related dimensions of reasoning. The first dimension consists of the elements of reasoning; the second dimension consists of the universal intellectual standards by which we measure student ability to use, in a skillful way, each of those elements of reasoning.

Elements of reasoning

Once we progress from thought which is purely associational and undisciplined, to thinking which is conceptual and inferential, thinking which attempts in some intelligible way to figure something out, in short, to reasoning, then it is helpful to concentrate on what can be called "the elements of reasoning". The elements of reasoning are those essential dimensions of reasoning which are present whenever and wherever reasoning occurs. Working together, they shape reasoning and provide a general logic to the use of reason. We can articulate these elements by paying close attention to what is implicit in the act of figuring anything out by the use of reason. These elements, then — purpose, question at issue, assumptions, inferences, implications, point of view, concepts and evidence — constitute a central focus in the assessment of student thinking.

Standards of Reasoning

When we assess student reasoning, we want to evaluate, in a reasonable, defensible, objective way, not just that students are reasoning, but how well they are reasoning. We will be assessing not just that they are using the elements of reasoning, but the degree to which they are using them well, critically, in accord with appropriate intellectual standards.

To assess a student response, whether written or oral, in structured discussion of content or in critical response to reading assignments, by how clearly or completely it states a position, is to assess it on the basis of a standard of reasoning. Similarly, assessing student work by how logically and consistently it defends its position, by how flexible and fair the student is in articulating other points of view, by how significant and realistic the student's purpose is, by how precisely and deeply the student articulates the question at issue — each of these is an evaluation based on standards of reasoning.

Distinct from such reasoning standards are other standards that teachers sometimes use to assess student work. To evaluate a student response on the basis of how concisely or elegantly it states a position is to use standards that are inappropriate to assessing student reasoning. Similarly, unrelated to the assessment of reasoning is evaluating student work by how humorous, glib, personal or sincere it is, by how much it agrees with the teacher's views, by how "well-written" it is, by how exactly it repeats the teacher's words, by the mere quantity of information it contains. The danger is that such standards are often conflated with reasoning standards, often unconsciously, and students are assessed on grounds other than the degree to which they are reasoning well.

The basic conditions implicit whenever we gather, conceptualize, apply, analyze, synthesize, or evaluate information — the elements of reasoning — are as follows:

1) Purpose, Goal, or End in View.

Whenever we reason, we reason to some end, to achieve some objective, to satisfy some desire or fulfill some need. One source of problems in student reasoning is traceable to defects at the level of goal, purpose, or end. If the goal is unrealistic, for example, or contradictory to other goals the student has, if it is confused or muddled in some way, then the reasoning used to achieve it is problematic.

A teacher's assessment of student reasoning, then, necessarily involves an assessment of the student's ability to handle the dimension of purpose in accord with relevant intellectual standards. It also involves giving feedback to students about the degree to which their reasoning meets those standards.

Is the student's purpose — in an essay, a research project, an oral report, a discussion — clear? Is the purpose significant or trivial or somewhere in between? Is the student's purpose, according to the most judicious evaluation on the teacher's part, realistic? Is it an achievable purpose? Does the student's overall goal dissolve in the course of the project, does it change, or is it consistent throughout? Does the student have contradictory purposes?

2) Question at Issue, or Problem to be Solved

Whenever we attempt to reason something out, there is at least one question at issue, at least one problem to be solved. One area of concern for assessing student reasoning, therefore, will be the formulation of the question to be answered or problem to be solved, whether with respect to the student's own reasoning or to that of others.

Assessing skills of mastery of this element of reasoning requires assessing — and giving feedback on — students' ability to formulate a problem in a clear and relevant way. It requires giving students direct commentary or whether the question they are addressing is an important one, whether it is answerable, on whether they understand the requirements for settling the question, for solving the problem.

3) Point of View, or Frame of Reference

Whenever we reason, we must reason within some point of view or frame of reference. Any "defect" in that point of view or frame of reference is a possible source of problems in the reasoning.

A point of view may be too narrow, too parochial, may be based on false or misleading analogies or metaphors, may contain contradictions, and so forth. It may be restricted or unfair. Alternatively, student reasoning involving articulation of their point of view may meet the relevant standards to a significant degree: their point of view may be broad, flexible, fair; it may be clearly stated and consistently adhered to.

Feedback to students would involve commentary noting both when students meet the standards and when they fail to meet them. Evaluation of students' ability to handle the dimension of point of view would also appropriately direct students to lines of reasoning that would promote a richer facility in reasoning about and in terms of points of view.

4) The Empirical Dimension of Reasoning

Whenever we reason, there is some "stuff," some phenomena about which we are reasoning. Any "defect," then, in the experiences, data, evidence, or raw material upon which a person's reasoning is based is a possible source of problems.

Students would be assessed and receive feedback on their ability to give evidence that is gathered and reported clearly, fairly, and accurately. Does the student furnish data at all? Is the data relevant? Is the information adequate for achieving the student's purpose? Is it applied consistently, or does the student distort it to fit her own point of view?

5) The Conceptual Dimension of Reasoning

All reasoning uses some ideas or concepts and not others. These concepts can include the theories, principles, axioms and rules implicit in our reasoning. Any "defect" in the concepts or ideas of the reasoning is a possible source of problems in student reasoning.

Feedback to students would note whether their understanding of theories and rules was deep or merely superficial. Are the concepts they use in their reasoning clear ones? Are their ideas relevant to the issue at hand, are their principles slanted by their point of view?

6) Assumptions

All reasoning must begin somewhere, must take some things for granted. Any "defect" in the assumptions or presuppositions with which the reasoning begins is a possible source of problems for students.

Assessing skills of reasoning involves assessing their ability to recognize and articulate their assumptions, again according to the relevant standards. The student's assumptions may be stated clearly or unclearly; the assumptions may be justifiable or unjustifiable, crucial or extraneous, consistent or contradictory.

The feedback students receive from teachers on their ability to meet the relevant standards will be a large factor in the improvement of student reasoning.

7) Implications and Consequences

No matter where we stop our reasoning, it will always have further implications and consequences. As reasoning develops, statements will logically be entailed by it. Any "defect" in the implications or consequences of our reasoning is a possible source of problems.

The ability to reason well is measured in part by an ability to understand and enunciate the implications and consequences of the reasoning. Students therefore need help in coming to understand both the relevant standards of reasoning out implications and the degree to which their own reasoning meets those standards.

When they spell out the implications of their reasoning, have they succeeded in identifying significant and realistic implications, or have they confined themselves to unimportant and unrealistic ones? Have they enunciated the implications of their views clearly and precisely enough to permit their thinking to be evaluated by the validity of those implications.

8) Inferences

Reasoning proceeds by steps in which we reason as follows: "Because this is so, that also is so (or probably so)," or "Since this, therefore that." Any "defect" in such inferences is a possible problem in our reasoning.

Assessment would evaluate students' ability to make sound inferences in their reasoning. When is an inference sound? When it meets reasonable and relevant standards of inferring. Are the inferences the student draws clear? Are they justifiable? Do they draw deep conclusions or do they stick to the trivial and superficial? Are the conclusions they draw consistent?

Helping Students Assess Their Thinking

1) All reasoning has a PURPOSE.

- · Take time to state your purpose clearly.
- · Distinguish your purpose from related purposes.
- · Check periodically to be sure you are still on target.
- · Choose significant and realistic purposes.

2) All reasoning is an attempt to FIGURE something out, to settle some QUESTION, solve some PROBLEM.

- · Take time to clearly and precisely state the question at issue.
- · Express the question in several ways to clarify its meaning and scope.
- · Break the question into sub-questions.
- Identify if the question has one right answer, is a matter of mere opinion, or requires reasoning from more than one point of view.

3) All reasoning is based on ASSUMPTIONS.

- · Clearly identify your assumptions and determine whether they are justifiable.
- · Consider how your assumptions are shaping your point of view.

4) All reasoning is done from some POINT OF VIEW.

- · Identify your point of view.
- · Seek other points of view and identify their strengths as well as weaknesses.
- · Strive to be fairminded in evaluating all points of view.

5) All reasoning is based on DATA, INFORMATION & EVIDENCE.

- Restrict your claims to those supported by the data you have.
- · Search for information that opposes your position as well as information that supports it.
- · Make sure that all information used is clear, accurate, and relevant to the question at issue.
- · Make sure you have gathered sufficient information.

6) All reasoning is expressed through, and shaped by, CONCEPTS and IDEAS.

- · Identify key concepts and explain them clearly.
- · Consider alternative concepts or alternative definitions to concepts.
- · Make sure you are using concepts with care and precision.

7) All reasoning contains INFERENCES or INTERPRETATIONS by which we draw CONCLUSIONS and give meaning to data.

- · Infer only what the evidence implies.
- · Check inferences for their consistency with each other.
- · Identify assumptions which lead you to your inferences.

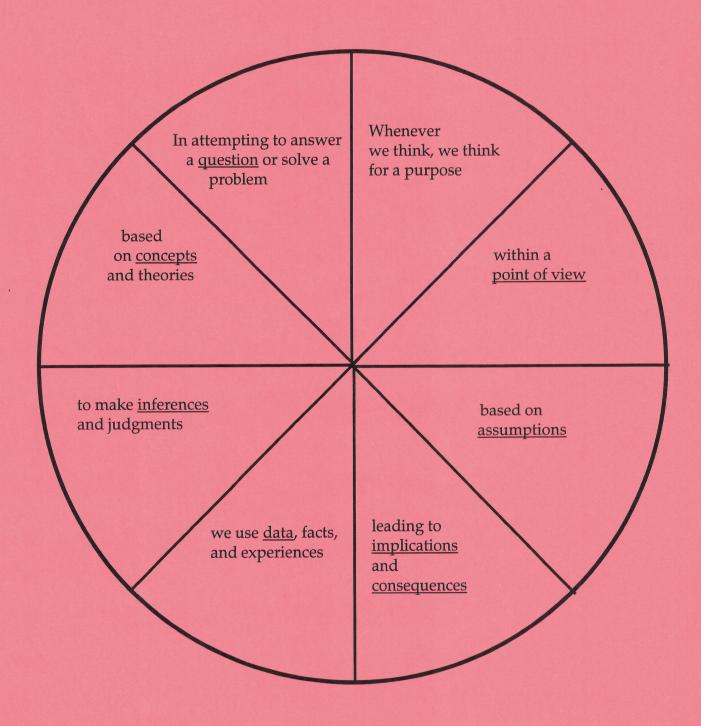
8) All reasoning leads somewhere or has IMPLICATIONS and CONSEQUENCES.

- · Trace the implications and consequences that follow from your reasoning.
- · Search for negative as well as positive implications.
- · Consider all possible consequences.

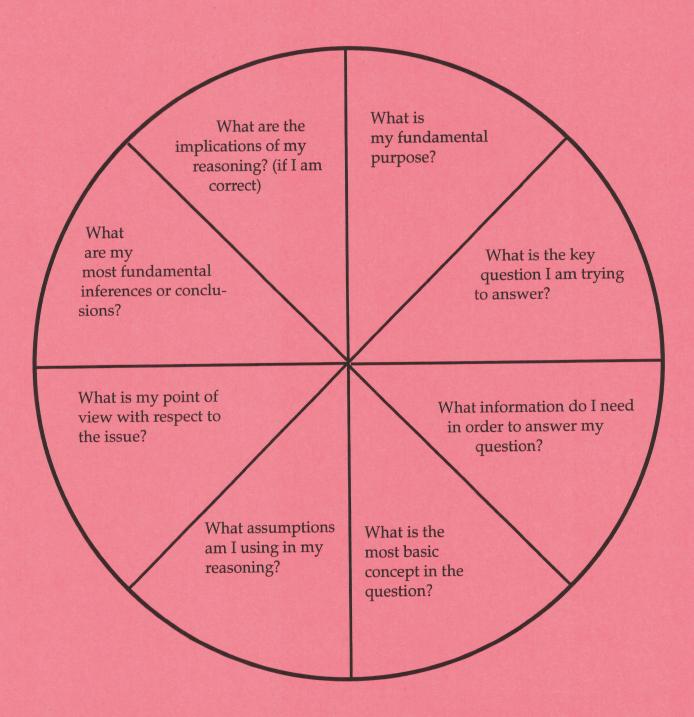
The Logic of____

1) The main purpose of this article is			
2) The key question is			
3) The most important information in this article is			
4) The main conclusions in this article are			
5) The key concept(s) we need to understand in this article is (are)			
6) The main assumption(s) underlying the author's thinking is (are)			
7) If people take this line of reasoning seriously, the implications are			
If people fail to take this line of reasoning seriously, the implications are			
8) The main point(s) of view presented in this article is (are)			
The Logic of a Textbook			
1) The main purpose of this textbook is			
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Universal Structures of Thought



Questions Implied by the Universal Structures of Thought



Some Reflections On the Importance of Clarity and Depth of Thinking

The Importance of Clarity and Depth of Thinking

Clarity: On Helping Students Think More Clearly

To clarify one must: explain, illustrate, give examples of, interpret, elaborate, refine, resolve, unravel, and specify. Once made clear, a thought is: distinct, evident, intelligible, obvious, plain, understandable, and vivid. When unclear, a thought is: confused, muddy, obscure, ambiguous, vague, dim, murky, indistinct, unspecified, unintelligible, blurred, mixed up, or entangled with other thoughts.

What One Gains Through Clarity of Thought:

- · a clear mind,
- · clear meaning,
- · a clear manner,
- · clear ideas,
- · clear purposes and goals,
- · clear questions,
- · clear information,
- · clear-cut implications,
- · clear conclusions, and
- · clear ways to think about things.

One finds out where one is, where one is going, and how one is getting there.

Why Clarity is Essential:

- · Without clarity of thought, no other evaluation can be made.
- Without clarity, we cannot judge relevance, depth, significance, accuracy, logicalness, consistency, coherence, etc...

Teaching Students To Think Clearly:

- · The key to clarity of thought is practice in the clarification of thought.
- · The structure of the class must provide for multiple, on-going acts of clarification.
- Instructors must continually ask questions that require students to engage in multiple acts of clarification.
- · Students must be continually asked to:
 - explain,
 - illustrate,
 - elaborate,
 - and give examples of:purposes, assignments, questions, information, concepts, meanings, conclusions, reasons, implications, and points of view.

Depth: On Helping Students To Think More Deeply

To deepen one's thought one must: go beyond the surface, the immediate, the simple, the commonly believed to the complex, the complicated, the many-sided, the intricate.

Once deepened, a thought is: more distinctly connected to other thoughts of significance, has more important implications and consequences, is more complicated, deals with more variables and factors, and takes into account more.

When superficial, a thought is: on the surface, simplistic, accords with common belief, explains little, solves little, and has no important implications or consequences, delays substantial attempts to deal with a problem, and typically deceives the believer.

What One Gains Through Depth of Thought:

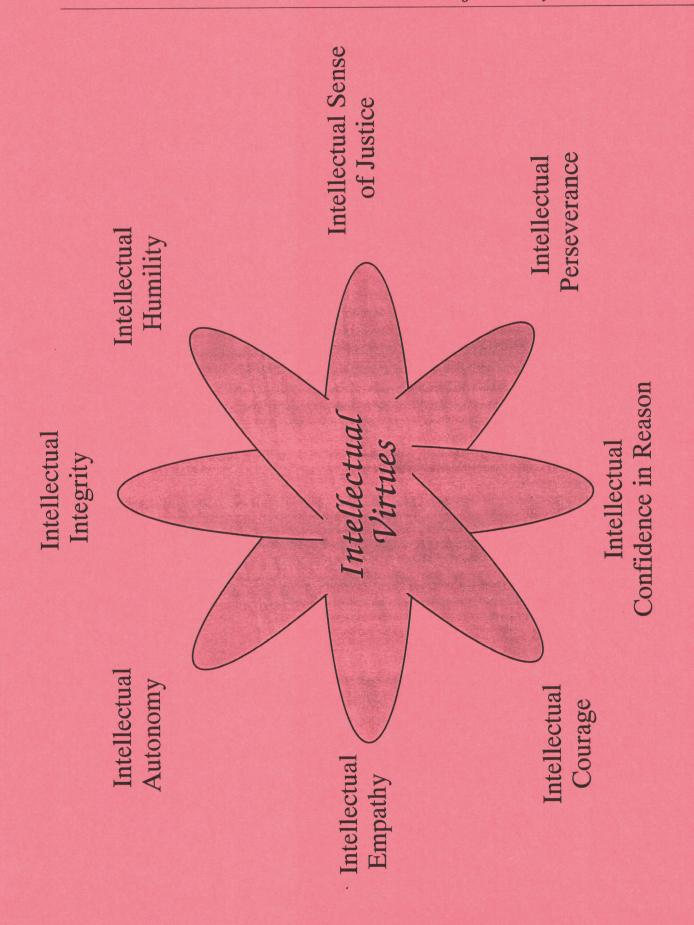
- · a deep mind,
- · deep meaning,
- · deep ideas,
- · significant goals,
- · important questions,
- · crucial information,
- · significant implications,
- · deep answers,
- · and a fuller, richer, truer view of things.

Why Depth of Thinking is Important:

- Without depth of thought, our minds become shallow. We accept what is superficial as if it were deep.
 We lack the ability to form significant goals. We don't ask important questions. We ignore crucial information. We are attracted by slogans and truisms. We end up with a narrow, limited, and distorted view of things.
- Without depth of thinking, we cannot see important factors, cannot integrate diverse variables, fail to see significant implications, and take into account only a small amount of what is relevant.

Teaching Students To Think Deeply:

- The key to depth of thought is practice in the "deepening" of thought.
- The structure of the class must provide for multiple, on-going acts of considering complexity.
- Instructors must continually ask questions that require students to engage in multiple acts of taking a variety of factors into account.
- Students must be continually asked to:
 - explain complexities,
 - illustrate complexity,
 - elaborate complexity,
 - give examples of complexity, in purposes, assignments, questions, information, concepts, meanings, conclusions, reasons, implications, and points of view.



Valuable Intellectual Traits

Intellectual Humility:

Having a consciousness of the limits of one's knowledge, including a sensitivity to circumstances in which one's native egocentrism is likely to function self-deceptively; sensitivity to bias, prejudice and limitations of one's viewpoint. Intellectual humility depends on recognizing that one should not claim more than one actually knows. It does not imply spinelessness or submissiveness. It implies the lack of intellectual pretentiousness, boastfulness, or conceit, combined with insight into the logical foundations, or lack of such foundations, of one's beliefs.

Intellectual Courage:

Having a consciousness of the need to face and fairly address ideas, beliefs or viewpoints toward which we have strong negative emotions and to which we have not given a serious hearing. This courage is connected with the recognition that ideas considered dangerous or absurd are sometimes rationally justified (in whole or in part) and that conclusions and beliefs inculcated in us are sometimes false or misleading. To determine for ourselves which is which, we must not passively and uncritically "accept" what we have "learned." Intellectual courage comes into play here, because inevitably we will come to see some truth in some ideas considered dangerous and absurd, and distortion or falsity in some ideas strongly held in our social group. We need courage to be true to our own thinking in such circumstances. The penalties for non-conformity can be severe.

Intellectual Empathy:

Having a consciousness of the need to imaginatively put oneself in the place of others in order to genuinely understand them, which requires the consciousness of our egocentric tendency to identify truth with our immediate perceptions of long-standing thought or belief. This trait correlates with the ability to reconstruct accurately the viewpoints and reasoning of others and to reason from premises, assumptions, and ideas other than our own. This trait also correlates with the willingness to remember occasions when we were wrong in the past despite an intense conviction that we were right, and with the ability to imagine our being similarly deceived in a case-at-hand.

Intellectual Integrity:

Recognition of the need to be true to one's own thinking; to be consistent in the intellectual standards one applies; to hold one's self to the same rigorous standards of evidence and proof to which one holds one's antagonists; to practice what one advocates for others; and to honestly admit discrepancies and inconsistencies in one's own thought and action.

INTELLECTUAL PERSEVERANCE:

Having a consciousness of the need to use intellectual insights and truths in spite of difficulties, obstacles, and frustrations; firm adherence to rational principles despite the irrational opposition of others; a sense of the need to struggle with confusion and unsettled questions over an extended period of time to achieve deeper understanding or insight.

Faith In Reason:

Confidence that, in the long run, one's own higher interests and those of humankind at large will be best served by giving the freest play to reason, by encouraging people to come to their own conclusions by developing their own rational faculties; faith that, with proper encouragement and cultivation, people can learn to think for themselves, to form rational viewpoints, draw reasonable conclusions, think coherently and logically, persuade each other by reason and become reasonable persons, despite the deep-seated obstacles in the native character of the human mind and in society as we know it.

Fairmindedness:

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

Developing Intellectual Empathy

Imagine yourself as the author of this article. In other words, try your best to think within her/his logic. Articulate to your partner your reasoning, including your purpose in writing the article, the main issue and the key question you are concerned with in the article, the information you used in reasoning through the fundamental issue, the main conclusions you came to, the assumptions you began with (i.e. whatever you took for granted as you wrote the article), the primary concepts you used in reasoning, and the implications which follow if your reasoning is sound.

Try to think through and articulate how the author might answer any objections to her/his line of reasoning in the most insightful way.

Your partner will question you during the process, primarily focusing on clarifying and assessing the accuracy of what you are saying, and to probe for depth of understanding.

The Interdependence of Traits of Mind

The traits of mind essential for critical thinking are interdependent. 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 in turn, we often must empathize with and reason within points of view toward which we are hostile. To achieve this end, we must typically persevere over a period of time, for learning to empathically enter a point of view against which we are biased takes time and significant effort. That effort will not seem justified unless we have the confidence in reason to believe we will not be "tainted" or "taken in" by whatever is false or misleading in the opposing viewpoint. Furthermore, merely believing we can survive serious consideration of an "alien" point 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 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.

To begin at another point, consider intellectual good faith or integrity. Intellectual integrity is clearly a difficult trait to develop. We are often motivated, generally without admitting to or being aware of this motivation, to set up inconsistent intellectual standards. Our egocentric or sociocentric tendencies make us ready to believe positive information about those we like, and negative information about those we dislike. We are likewise strongly inclined to believe what serves to justify our vested interest or validate our strongest desires. Hence, all humans have some innate mental tendencies to operate with double standards, which of course is paradigmatic of intellectual bad faith. Such modes of thinking often correlate quite well with getting ahead in the world, maximizing our power or advantage, and getting more of what we want.

Nevertheless, it is difficult to operate explicitly or overtly with a double standard. We therefore need to avoid looking at the evidence too closely. We need to avoid scrutinizing our own inferences and interpretations too carefully. At this point, a certain amount of intellectual arrogance is quite useful. I may assume, for example, that I know just what you're going to say (before you say it), precisely what you are really after (before the evidence demonstrates it), and what actually is going on (before I have studied the situation carefully). My intellectual arrogance may make it easier for me to avoid noticing the unjustifiable discrepancy between the standards I apply to you and the standards I apply to myself. Of course, if I don't have to empathize with you, that too makes it easier to avoid seeing my duplicity. I am also better positioned if I lack a keen need to be fair to your point of view. A little background fear of what I might discover if I seriously considered the consistency of my own judgments can be quite useful as well. In this case, my lack of intellectual integrity is supported by my lack of intellectual humility, empathy, and fairmindedness.

Going in the other direction, it will be difficult to use a double standard if I feel a responsibility to be fair to your point of view, see that this responsibility requires me to view things from your perspective empathically, and do so with some humility, recognizing I could be wrong, and you right. The more I dislike you personally, or feel wronged in the past by you or by others who share your way of thinking, the more pronounced in my character the trait of intellectual integrity and good faith must be to compel me to be fair.

Purpose

(All reasoning has a purpose)

Primary Standards: 1) Clarity of purpose, 2) Significance of purpose, 3) Achievability of purpose, 4) consistency of purpose, 5) Fairmindedness of Purpose

Common Problems: 1) Unclear purpose, 2) Trivial purpose, 3) Unrealistic purposes, 4) Contradictory purposes, 5) Unfair purpose

Principle: To reason well, you must clearly understand your purpose and your purpose must be fairminded.

Skilled Reasoners:	Unskilled Reasoners:	Critical Reflections:
take the time to state their purpose clearly,	are often unclear about their central purpose	Have I made the purpose of my reasoning clear? What exactly am I trying to achieve? Have I stated the purpose in several ways in order to clarify it?
distinguish it from related purposes	oscillate between different, sometimes contradictory purposes	What different purposes do I have in mind? How do I see them as related? Am I going off in somewhat different directions? How can I reconcile these contradictory purposes?
periodically remind themselves of their purpose to determine whether they are straying from it	lose track of their fundamental end or goal	In writing this proposal do I seem to be wandering from my purpose? How do my 3rd and 4th paragraphs relate to my central goal?
adopt realistic purposes and goals	adopt unrealistic purposes, set unrealistic goals	Am I trying to accomplish too much in this proposal?
choose significant purposes and goals	adopt trivial purposes and goals as if they were significant	What is the significance of pursuing this particular purpose? Is there a more significant purpose I should be focused on?
choose goals and purposes that are consistent with other goals and purposes they have chosen	inadvertently negate their own purposes do not monitor their thinking for inconsistent goals	Does one part of my proposal seem to undermine what I am trying to accomplish in another part?
adjust their thinking regularly to their purpose	do not adjust their thinking regularly to their purpose	Does my argument stick to the issue? Am I acting consistently within my purpose?
choose purposes which are fairminded, considering the desires and rights of others equally with one's own desires and rights	choose purposes which are self-serving at the expense of others' needs and desires.	Is my purpose self-serving, or concerned only with my own desires? Does it take into account the rights and needs of other people?

Question at Issue or Central Problem

(All reasoning is an attempt to figure something out, to settle some question, solve some problem.)

Primary Standards: 1) Clarity and Precision of Question, 2) Significance of Question, 3) Answerability, 4) Relevance

Common Problems: 1) Unclear and Unprecise, 2) Insignificant, 3) Not Answerable, 4) Irrelevant

Principle: To settle a question, it must be answearable, and you must be clear about it and understand what is needed to adequately answer it.

Skilled Reasoners:	Unskilled Reasoners:	Critical Reflections:
are clear about the question they are trying to settle	are often unclear about the question they are asking	Am I clear about the main question at issue? Am I able to precisely state it?
can re-express a question in a variety of ways	express questions vaguely and find questions difficult to reformulate for clarity	Am I able to reformulate my question in several ways to recognize the complexity of it?
can break a question into sub- questions	are unable to break down the questions they are asking	Have I broken down the main question into sub-questions? What are the sub-questions embedded in the main question?
routinely distinguish questions of different types	confuse questions of different types and thus often respond inap- propriately to the questions they ask	Am I confused about the type of question I am asking? For example: Am I confusing a legal question with an ethical one? Am I confusing a question of preference with a question requiring judgement?
distinguish significant from trivial questions	confuse trivial questions with significant ones	Am I focusing on trivial questions while other significant questions need to be addressed?
distinguish relevant questions from irrelevant ones	confuse irrelevant questions with relevant ones	Are the questions I'm raising in this discussion relevant to the main question at issue?
are sensitive to the assumptions built into the questions they ask	often ask loaded questions	Is the way I'm putting the question loaded? Am I taking for granted from the outset the correctness of my own position?
distinguish questions they can answer from questions they can't	try to answer questions they are not in a position to answer.	Am I in a position to answer this question? What information would I need to have before I could answer the question?

Information

(All reasoning is based on data, information, evidence, experience, research.)

Primary Standards: 1) Clear Evidence, 2) Relevant Information, 3) Fairly Gathered and Reported Evidence, 4) Accurate Data, 5) Adequate Evidence, 6) Consistently Applied Data

Common Problems: 1) unclear, 2) irrelevant, 3) biased, 4) inaccurate, 4) insufficient, 6) inconsistently applied

Principle: Reasoning can only be as sound as the evidence it is based on.

Skilled Reasoners:	Unskilled Reasoners:	Critical Reflections:
assert a claim only when they have sufficient evidence to back it up	assert claims without considering all relevant evidence	Is my assertion supported by evidence?
can articulate and evaluate the information behind their claims	don't articulate the information they are using in their reasoning and so do not subject it to rational scrutiny	Do I have evidence to support my claim which I haven't clearly articulated? Have I evaluated the information I am using for accuracy and relevance?
actively search for information <i>against</i> (not just <i>for</i>) their own position	gather evidence only when it supports their own point of view	Where is a good place to look for evidence on the opposite side? Have I looked there? Have I honestly considered information that doesn't support my position?
focus on relevant information and disregard what is irrelevant to the question at issue	do not carefully distinguish between relevant data and irrelevant data	Is my data relevant to the claim I'm making? Have I failed to consider relevant information?
draw conclusions only to the extent that they are supported by the data	make inferences that go beyond what the data support	Does my claim go beyond the evidence I've cited?
state their evidence clearly and fairly	distort the data, or state it inaccurately	Is my presentation of the pertinent information clear and coherent? Have I distorted information to support my position?

Interpretation and Inference

(All reasoning contains inferences from which we draw conclusions and give meaning to data and situations)

Primary Standards: 1) Clarity of Inferences, 2) Logicalness of Inferences, 3) Justifiability of Inferences, 4) Profundity of Conclusions, 5) Reasonability of Conclusions, 6) Consistency of Conclusions

Common Problems: 1) Unclear, 2) Illogical, 3) Unjustified, 4) Superficial, 5) Unreasonable, 6) Contradictory

Principle: Reasoning can only be as sound as the inferences it makes (or the conclusions it comes to).

Skilled Reasoners:	Unskilled Reasoners:	Critical Reflections:
are clear about the inferences they are making clearly articulate their inferences	often unclear about the inferences they are making do not clearly articulate their inferences	Am I clear about the inferences I am making? Have I clearly articulated my conclusions?
usually make inferences that follow from the evidence or reasons presented	often make inferences that do not follow from the evidence or reasons presented	Does my conclusion logically follow from the evidence and reasons presented?
often make inferences that are deep rather than superficial	often make inferences that are superficial	Is my conclusion superficial, given the problem?
often make inferences or come to conclusions that are reasonable	often make inferences or come to conclusions that are unreasonable	Are my conclusions reasonable?
make inferences or come to conclusions that are consistent with each other	often make inferences or come to conclusions that are contradictory	Do the conclusions I come to in the first part of my analysis seem to contradict the conclusions that I come to at the end?
understand the assumptions which lead to inferences	do not seek to figure out the assumptions which lead to inferences	Is my inference based on a faulty assumption? How might my inference be changed if I based it on a different, more justifiable, assumption?

Concepts and Ideas

(All reasoning is expressed through, and shaped by, concepts and ideas.)

Primary Standards: 1) Clarity of Concepts, 2) Relevance of Concepts, 3) Depth of Concepts, 4) Accuracy of the use of Concepts

Common Problems: 1) Unclear, 2) Irrelevant, 3) Superficial, 4) Inaccurate

Principle: Reasoning can only be as clear, relevant, realistic, and deep as the concepts which shape it.

Skilled Reasoners:	Unskilled Reasoners:	Critical Reflections:
are aware of the key concepts and ideas they and others use	are unaware of the key concepts and ideas they and others use	What is the main concept I am using in my thinking? What are the main concepts this author is using?
are able to explain the basic implications of the key words and phrases they use	do not accurately explain basic implications of their key words and phrases	Am I clear about the implications of concepts? For example: Does the word 'cunning' have negative implications that the word 'clever' does not?
are able to distinguish special, non-standard uses of words from standard uses	are not able to recognize when their use of a word or phrase departs from educated usage	Where did I get my definition of this central concept? For example: Where did I get my definition of the concept 'management'? Have I put my unwarranted conclusions into the definition?
are aware of irrelevant concepts and ideas and use concepts and ideas in ways relevant to their functions	use concepts in ways inappropriate to the subject or issue	Am I using the concept "management" appropriately? For example: Do I unknowingly act as if "management" implies a right to "oppress" those I supervise?
think deeply about the concepts they use	fail to think deeply about the concepts they use	Am I thinking deeply enough about this concept? For example: The concept of health care, as I describe it, does not take into account the rights and privileges of the patient. Do I need to consider the idea of health care more deeply?

Assumptions

(All reasoning is based on assumptions - on beliefs we take for granted.)

Primary Standards: 1) Clarity of Assumptions, 2) Justifiability of Assumptions, 3) Consistency of Assumptions

Common Problems: 1) Unclear, 2) Unjustified, 3) Contradictory

Principle: Reasoning can only be as sound as the assumptions it is based on.

Skilled Reasoners: make assumptions that are clear	Unskilled Reasoners: often make assumptions that are unclear	Critical Reflections: Are my assumptions clear to me? Do I clearly understand what my assumptions are based upon?
make assumptions that are reasonable, justifiable given the situation and evidence	often make unjustified or unreasonable assumptions	Do I make assumptions about the future based on just one experience from the past? Can I fully justify what I am taking for granted? Are my assumptions justifiable given the evidence I am using to support them?
make assumptions that are consistent with each other	often make assumptions that are contradictory	Do the assumptions I made in the first part of my argument contradict the assumptions I am making now?
constantly seek to figure out what their assumptions are	ignore their assumptions	What assumptions am I making in this situation? Are they justifiable? Where did I get these assumptions?

Implications and Consequences

(All reasoning leads somewhere. It has implications and when acted upon, has consequences.)

Primary Standards: 1) Significance of Implications, 2) Logicalness of Implications, 3) Clarity of Articulated Implications, 4) Precision of Articulated Implications, 5) Completeness of Articulated Implications

Common Problems: 1) Unimportant, 2) Unrealistic, 3) Unclear, 4) Imprecise, 5) Incomplete

Principle: To reason well through an issue, you must think through the implications that follow from your reasoning. You must think through the consequences likely to follow from the decisions you make.

Skilled Reasoners: trace out a number of significant potential implications and consequences of their reasoning	Unskilled Reasoners: trace out few or none of the implications and consequences of holding a position or making a decision	Critical Reflections: Did I spell out all the significant consequences of the action I am advocating? If I took this course of action, what other consequences might follow that I haven't considered?
articulate the possible implications and consequences clearly and precisely	are unclear and imprecise in the possible consequences they articulate	Have I delineated clearly and precisely the consequences likely to follow from my chosen action?
search for potential negative as well as for potential positive consequences	trace out only the consequences they had in mind at the beginning, either positive or negative, but usually not both	I may have done a good job of spelling out some positive implications of the decision I am about to make, but what are some of the possible negative implications or consequences?
anticipate the likelihood of unexpected negative and positive implications	are surprised when their decisions have unexpected consequences	If I make this decision, what are some possible unexpected implications? What are some variables out of my control that might lead to negative consequesnces?

Point of View

(All reasoning is done from some point of view.)

Primary Standards: 1) Flexibility in Point of View, 2) Fairness of Point of View, 3) Clarity of Point of View, 4) Breadth of Point of View, 5) Relevance of Point of View

Common Problems: 1) Restricted, 2) Biased, 3) Unclear, 4) Narrow, 5) Irrelevant

Principle: To reason well, you must determine all points of view relevant to the issue and enter these viewpoints empathetically.

Skilled Reasoners:	Unskilled Reasoners:	Critical Reflections:
keep in mind that people have different points of view, especially on controversial issues	do not credit alternative viewpoints	Have I articulated the point of view from which I am approaching this issue? Have I considered opposing points of view regarding this issue?
consistently articulate other points of view and reason from within those points of view in order to adequately understand other points of view	cannot see issues from points of view that are significantly different from their own; cannot reason with empathy from alien points of view	I may have characterized my own point of view, but have I considered the most significant aspects of the problem from X's point of view?
seek other viewpoints, especially when the issue is one they believe in passionately	can sometimes give other points of view when the issue is not emotionally charged, but cannot do so for issues they are deeply committed to	Am I presenting X's point of view in an unfair manner? Am I having difficulty appreciating X's viewpoint because I am so emotional about this issue?
confine their monological reasoning to problems that are clearly monological	confuse multilogical with monological issues, insist that there is only one frame of reference within which a given multilogical question must be decided	Is the question here monological or multilogical? How can I tell? Am I reasoning as if only one point of view is relevant to this issue when in reality other viewpoints are relevant?
recognize when they are most likely to be prejudiced	are unaware of their own prejudices	Is this prejudice or reasoned judgment? Where does my prejudice come from?
approach problems and issues with a richness of vision and an appropriately broad point of view	reason from within inappropriately narrow or superficial points of view	Is my approach to this question too narrow? Am I considering other viewpoints in order to adequately address the problem?

Universal Intellectual Standards:

And questions that can be used to apply them.

Universal intellectual standards are standards which must be applied to thinking whenever one is interested in checking the quality of reasoning about a problem, issue, or situation. To think critically entails having command of these standards. To help students learn them, teachers should pose questions which probe student thinking, questions which hold students accountable for their thinking, questions which, through consistent use by the teacher in the classroom, become internalized by students as questions they need to ask themselves.

The ultimate goal, then, is for these questions to become infused in the thinking of students, forming part of their inner voice, which then guides them to better and better reasoning. While there are a number of universal standards, the following are the most significant:

Clarity:

Could you elaborate further on that point? Could you express that point in another way? Could you give me an illustration? Could you give me an example?

Clarity is a gateway standard. If a statement is unclear, we cannot determine whether it is accurate or relevant. In fact, we cannot tell anything about it because we don't yet know what it is saying. For example, the question "What can be done about the education system in America?" is unclear. In order to adequately address the question, we would need to have a clearer understanding of what the person asking the question is considering the "problem" to be. A clearer question might be "What can educators do to ensure that students learn the skills and abilities which help them function successfully on the job and in their daily decision-making?"

Accuracy:

Is that really true? How could we check that? How could we find out if that is true? A statement can be clear but not accurate, as in "Most dogs are over 300 pounds in weight."

Precision:

Could you give me more details? Could you be more specific? A statement can be both clear and accurate, but not precise, as in "Jack is overweight" (We don't know how overweight Jack is, one pound or 500 pounds.).

Relevance:

How is that connected to the question? How does that bear on the issue? A statement can be clear, accurate, and precise, but not relevant to the question at issue. For example, students often think that the amount of effort they put into a course should be used in raising their grade in a course. Often, however, "effort" does not measure the quality of student learning, and when that is so, effort is irrelevant to their appropriate grade.

Depth:

How does your answer address the complexities in the question? How are you taking into account the problems in the question? Is that dealing with the most significant factors?

A statement can be clear, accurate, precise, and relevant, but superficial (that is, lack depth). For example, the statement "Just Say No" which is often used to discourage children and teens from using drugs, is clear, accurate, precise, and relevant. Nevertheless, it lacks depth because it treats an extremely complex issue, the pervasive problem of drug use among young people, superficially. It fails to deal with the complexities of the issue.

Breadth:

Do we need to consider another point of view? Is there another way to look at this question? What would this look like from a conservative standpoint? What would this look like from the point of view of...?

A line of reasoning may be clear, accurate, precise, relevant, and deep, but lack breadth (as in an argument from either the conservative or liberal standpoints which gets deeply into an issue, but only recognizes the insights of one side of the question.)

Logic:

Does this really make sense? Does that follow from what you said? How does that follow? But before you implied this and now you are saying that, I don't see how both can be true.

When we think, we bring a variety of thoughts together into some order. When the combination of thoughts are mutually supporting and make sense in combination, the thinking is "logical." When the combination is not mutually supporting, is contradictory in some sense, or does not "make sense," the combination is "not logical."

Clarity

Could you elaborate further?
Could you give me an example?
Could you illustrate what you mean?

Accuracy

How could we check on that? How could we find out if that is true? How could we verify or test that?

Precision

Could you be more specific? Could you give me more details? Could you be more exact?

Relevance

How does that relate to the problem? How does that bear on the question? How does that help us with the issue?

Depth

What factors make this a difficult problem? What are some of the complexities of this question? What are some of the difficulties we need to deal with?

Breadth

Do we need to look at this from another perspective?
Do we need to consider another point of view?
Do we need to look at this in other ways?

Logic

Does all this make sense together?

Does your first paragraph fit in with your last?

Does what you say follow from the evidence?

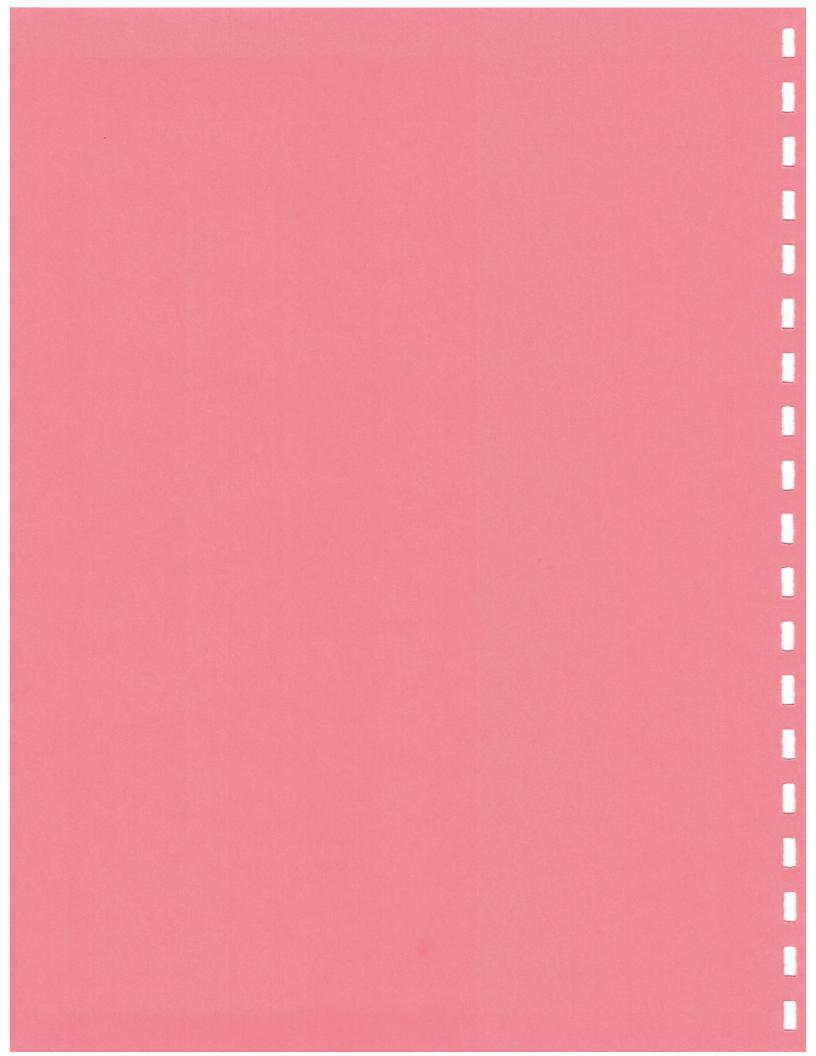
Significance

Is this the most important problem to consider? Is this the central idea to focus on? Which of these facts are most important?

Fairness

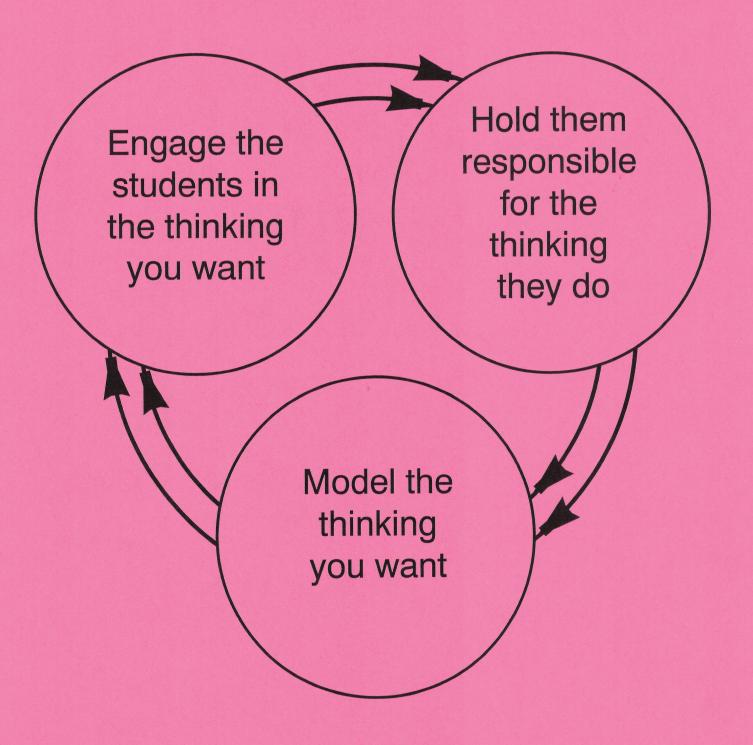
Do I have any vested interest in this issue? Am I taking into account the thinking of others? Have I examined my thinking for prejudice?

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Part Four

Learning to Design Structures & **Tactics That** Facilitate Thinking



The Concept of the Course/Subject

The main goal is to think...

or to think like a...

An Overview of How to Design Instruction

The Logic of Instructional Design

Instructional design involves two deeply interrelated parts: structures and tactics. In this section of the workshop we will focus on **structures**.

Structures involve the "what" of the course:

What am I going to teach? What content am I going to teach? What questions or problems will be central to the course? What concepts will be fundamental? What amount of information will students need to access? What point of view or frame of reference do they need to learn to reason within? What is my concept of the course? What overall plan shall I adopt? What requirements shall I set up? What grading requirements? What performance profiles? etc...

Tactics involve the "how" of the course:

How am I going to teach so as to make the structures work? How am I going to get the students to be actively involved? How am I going to get them to develop insights, understandings, knowledge, and ability that are essential? How am I going to get them to learn to "reason" their way to the answers to questions in the field?

Five Important Structural Determinations that Set the Stage For Everything Else

We suggest that for every course you teach, there are five defining dimensions you should carefully think through (You should note that each of these "structures" have a "tactical" dimension to them. That is, something of the "how" (you will cover) is implicit in these decisions as to "what" (you will cover).

- · your concept of the course,
- · the general plan for implementing that concept,
- · the requirements the students must meet,
- · the grading policies in the course (when applicable), and
- performance profiles (that correlate with the grade levels).

The students, in other words, should know from the beginning what in general is going to be happening in the course, how they are going to be assessed, and what they should be striving to achieve. To put it yet another way, the students should know, from the beginning, what they are going to be doing most of the time—- THIS should not be passive listening—-and what exactly is expected of them in that doing. The aim of the course should be carefully spelled out. It is usually helpful to contrast the aim with that of standard didactically taught courses. It is useful to ask oneself what kind of reasoning is going to be central to learning the content (historical, mathematical, biological, literary, etc...)

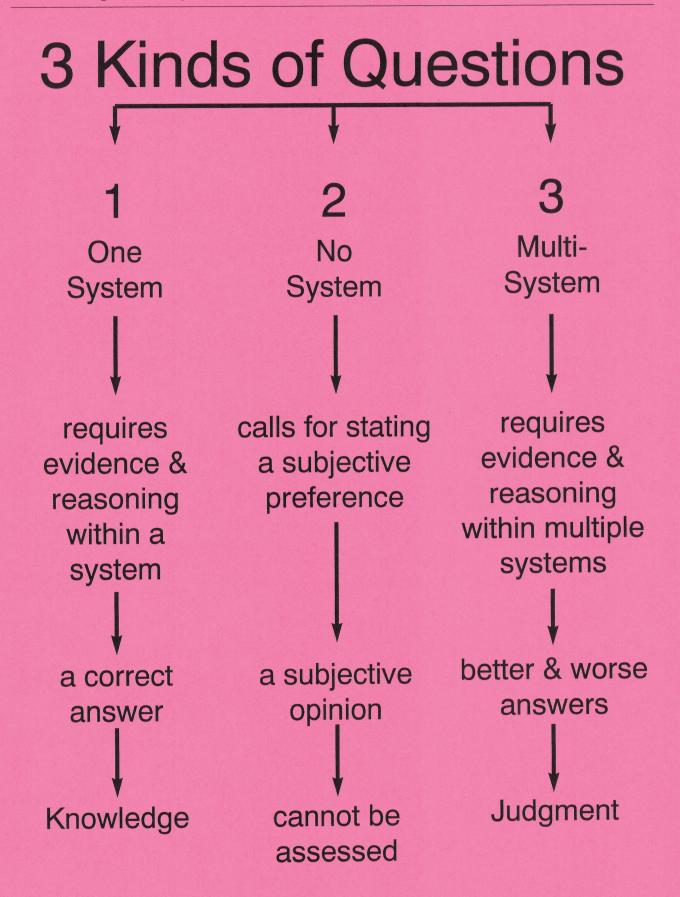
In addition to a written syllabus, the students should be given an orientation to the mechanics of the course (as you were given an orientation to the mechanics of this workshop). This orientation should include an oral explanation of the concept of the course, the plan, the requirements, the performance profiles and any other salient features of the design. The overall logic of the course should be made as clear as possible. You might consider using a "student understandings" sign-off sheet (a model will be presented to you).

Studies have indicated that, on average, 90% of the decisions made about instruction are a result of the textbook chosen. But textbooks should not drive instruction, since most textbooks are not structured to enhance critical thinking in the subject. Our decisions made about the structure and tactics of our courses should be a result of our concept of the course, of our most fundamental objectives in teaching the course.

Once we have the most basic structure (and substructures) of our course decided, we must focus on the tactics we will use to drive that structure home, to enable that structure to be effectively achieved. One can divide tactics in two different ways. The first way is into daily tactics (what we will be doing everyday) and episodic (what we will do from time to time). The second way to divide tactics is into complex and simple. Socratic instruction, teaching students how to read critically, devising an oral test format, developing tactics for student self-assessment: these are all complex tactics. As the complex ones have multiple parts and often require an extended period of time to be carried out, they are generally harder to master. On the other hand, most simple tactics, like calling on students who don't have their hands up, asking that students summarize what other students have said, requiring students to state the purpose of an assignment or to express the question on the floor—are rather easy to learn and can take up much less time.

To illustrate these two distinctions, some instructors may choose to do some Socratic instruction everyday, or simply to use it episodically, or just to lead off units. Designing an instructional day around an activity (with Task, Purpose, Question, and Tactic—see workshop samples) is another complex tactic, but it is one that may be used daily. Complex daily tactics may involve a variety of different simple tactics from day to day—see the teaching tactics listed in your workshop assignments.

In sum, instructional design involves a teacher thinking about instruction in both structural and tactical ways. Overall structural thinking—for example, about the concept for the course—can help free a teacher from the Didactic Model into which we have been conditioned and the ineffective teaching that invariably accompanies it. Simple and complex tactical thinking can provide the means by which we can follow through on our structural decisions in an effective way. Our teaching will not be transformed simply because we philosophically believe in the value of critical thinking. We must find practical ways to bring it into instruction, both structurally and tactically.



Three Categories of Questions: Crucial Distinctions

Many pseudo critical thinking approaches present all judgments as falling into two exclusive and exhaustive categories: fact and opinion. Actually, the kind of judgment most important to educated people and the kind we most want to foster falls into a third, very important, and now almost totally ignored category, that of reasoned judgment. A judge in a court of law is expected to engage in reasoned judgment; that is, the judge is expected not only to render a judgment, but also to base that judgment on sound, relevant evidence and valid legal reasoning. A judge is not expected to base his judgments on his subjective preferences, on his personal opinions, as such. You might put it this way, judgment based on sound reasoning goes beyond, and is never to be equated with, fact alone or mere opinion alone. Facts are typically used in reasoning, but good reasoning does more than state facts. Furthermore, a position that is well-reasoned is not to be described as simply "opinion." Of course, we sometimes call the judge's verdict an "opinion," but we not only expect, we demand that it be based on relevant and sound reasoning.

Here's a somewhat different way to put this same point. It is essential when thinking critically to clearly distinguish three different kinds of questions:

- 1) Those with one right answer (factual questions fall into this category)
 - What is the boiling point of lead?
- 2) Those with as many answers as there are different human preferences (a category in which mere opinion does rule).
 - Which would you prefer, a vacation in the mountains or one at the seashore?
- 3) Those with better or worse answers (well-reasoned or poorly reasoned answers)
 - · How can we best address the most basic and significant economic problems of the nation today?

Only the second kind of question is a matter of sheer opinion. The third kind is a matter of reasoned judgment — we can rationally evaluate answers to the question (using universal intellectual standards such as clarity, depth, consistency and so forth).

When questions that require better or worse answers are treated as matters of opinion, pseudo critical thinking occurs. Students come, then, to uncritically assume that everyone's "opinion" is of equal value. Their capacity to appreciate the importance of intellectual standards diminishes, and we can expect to hear questions such as these: What if I don't like these standards? Why shouldn't I use my own standards? Don't I have a right to my own opinion? What if I'm just an emotional person? What if I like to follow my intuition? What if I don't believe in being "rational?" They then fail to see the difference between offering legitimate reasons and evidence in support of a view and simply asserting the view as true. The failure to teach students to recognize, value, and respect good reasoning is one of the most significant failings of education today.

Structures For Student Self-Assessment

Critical thinking is thinking that assesses itself. To the extent that our students need us to tell them how well they are doing, they are not thinking critically. Didactic instruction makes students overly dependent on the teacher. In such instruction, students rarely develop any perceptible intellectual independence and typically have no intellectual standards to assess their thinking with. Instruction that fosters a disciplined, thinking mind, on the other hand, is 180 degrees in the opposite direction. Each step in the process of thinking critically is tied to a self-reflexive step of self-assessment. As a critical thinker, I do not simply state the problem; I state it and assess it for its clarity. I do not simply gather information; I gather it and check it for its relevance and significance. I do not simply form an interpretation; I check my interpretation to see what it is based on and whether that basis is adequate.

Because of the importance of self-assessment to critical thinking, it is important to bring it into the structural design of the course and not just leave it to episodic tactics. Virtually everyday, for example, students should be giving (to other students) and receiving (from other students) feedback on the quality of their work. They should be regularly using intellectual standards in an explicit way. This should be designed into instruction as a regular feature of it.

There are two kinds of criteria that students need to assess their learning of content. They need universal criteria that apply to all of their thinking, irrespective of the particular task. For example, they should always be striving for clarity, accuracy, and significance. Of course, they also need to adjust their thinking to the precise demands of the question or task before them. If there are three parts of the task, they need to attend to all three parts. If the question requires that they find specialized information, then they need to do just that

One simple structure to use in attending to this dual need is to provide students a set of performance criteria that apply to all of their work, criteria that they will be using over and over. Then, make specific provision for encouraging students to think in a focused way about the particular demands of any given task or question before them. There are a variety of additional structures that can be used:

Assessing Writing

- 1) students in groups of four, choose the best paper, then join with a second group and choose the best of the two. This last paper is read to the class as a whole and a class-wide discussion is held about the strengths and weaknesses of the papers chosen, leading to the class voting on the best paper of the day.
- 2) students in groups of three or four write out their recommendations for improvement on three or four papers (from students not in the group). The written recommendations go back to the original writer who does a revised draft for next time.
- 3) students in groups of three or four take turns reading their papers and discuss the extent to which they have or have not fulfilled the performance criteria relevant to the paper.
- 4) one student's paper is read aloud slowly to the class while the instructor leads a class-wide discussion on how the paper might be improved. Then the students work in groups of two or three to try to come up with recommendations for improvement for the students in their group (based on the model established by the instructor).

Assessing Listening

Since students spend a good deal of their time listening, it is imperative that they learn critical listening.

- 1) We need to call on them regularly and unpredictably, holding them responsible either to ask questions of clarification or to be prepared to give a summary, elaboration, and examples of what others have said.
- 2) We ask every student to write down the most basic question they need to have answered in order to understand what is being discussed. You then collect the questions (to see where they are at) or you call on some of them to read their questions aloud or you put them in groups of two with each person trying to answer the question of the other.

Through activities such as these students should learn to monitor their listening, determining when they are and when they are not following what is being said. This should lead to their asking pointed questions.

Assessing Speaking

In a well-designed class, students engage in oral performances often. They articulate what they are learning: explaining, giving examples, posing problems, interpreting information, tracing assumptions, etc... They need to learn to assess what they are saying, becoming aware of when they are being vague, when they need an example, what their explanations are inadequate, etc... Here are three general strategies that have a number of tactical forms.

- 1) Students teaching students. One of the best ways to learn is to try to teach someone else. If one has trouble explaining something, it is often because one is not as clear as one needs to be about what one is explaining.
- 2) Group Problem Solving. By putting students in a group and giving them a problem or issue to work on together, their mutual articulation and exchanges will often help them to think better. They will often help correct each other, and so learn to "correct" themselves.
- 3) Oral test on basic vocabulary. One complex tactic that aids student learning is the oral test. Students are given a vocabulary list. They are put into groups of twos or threes and are asked to take turns explaining what the words mean. They are encouraged to assess each other's explanations. When some seem prepared, they are assessed by the teacher. The students who pass then become "certifiers" or "tutors" and are assigned to assess other students (or tutor them). Everyone gets multiple experiences explaining, and hearing explanations of, the basic vocabulary.

Assessing Reading

In a well-designed class, students typically engage in a great deal of reading. Hence, it is important that they learn to "figure out" the logic of the what they are reading (the logically interconnected meanings). Good reading is a dialogue between the reader and the writer. The writer has chosen words in which to convey the meaning of his/her thoughts and experiences. The reader must translate from those words back into his/her own thoughts and experiences, and capture the meaning of the author thereby. This is a complex process requiring good reasoning. We can teach the students the process best by modeling it in the following way:

Structure for teaching critical reading. You put the students into groups of threes, each with a letter assigned (A, B, or C). You then read a paragraph or two out of the text aloud slowly, commenting on what you are reading as you are reading, explaining what is making immediate sense to you and what you need to figure out by further reading. After modeling in this manner for a couple of paragraphs, you ask A to take over and read aloud to B and C, explaining to them, sentence by sentence, what he/she is able to figure out and what he/she is not. After A is finished with two paragraphs, then B and C comment on what they do and do not understand (in the paragraphs that A read). Then you read aloud to the whole class the two paragraphs that A read, commenting as you go. Then B takes over and reads the next two paragraphs

to A and C. Then A and C add their thoughts. Then you read aloud what B read. Then you go on to C who reads the next two paragraphs to A and B. And so on. And so forth. As the students are reading in their groups of three, you are circulating around the room listening in and getting an idea of the level of proficiency of their critical reading. The more you use this process, the better students get.

Doing A Global Self-Assessment

One of the most powerful complex structures is that of requiring students to do a global analysis of the strengths and weaknesses of their performance in a class overall. In order for this tactic to work, the following have to be true:

- · students must be given, early on, performance profiles (correlated with grades)
- students must be given multiple opportunities to assess their own work and that of their peers using the performance profiles
- students must be given a thorough orientation on what is and is not expected in the global self-assessment
- students should be required to support all claims that they make with relevant and representative evidence and reasoning
- students should understand that if they argue for a higher grade than they deserve, their grade will be lowered.

A Model For Developing Your Self-Assessment

The Pre-writing Phase

- 1) **Review and Get Clear About Your Task**. Remember your purpose: to demonstrate that you can accurately document your own level of performance in critical thinking by assembling evidence and developing commentary on that evidence that links the evidence to the criteria provided for the grade of A, B, C, D, or F.
- 2) **Form a Hypothesis**. One possible way to begin is to form a hypothesis as to the "range" of your performance (by a provisional examination of your work and a provisional analysis of the criteria for A, B,...). That is, I form an initial hypothesis to the effect that I am in the A/B range, in the B/C range, in the C/D range, or in the D/F range.
- 3) **Pre-test Your Hypothesis**. If you are comfortable with an initial hypothesis you can then study the criteria for the two grades in detail especially what separates them to get the criteria well in mind. You can then look carefully at some of your papers with those criteria in mind and see if your hypothesis seems to be legitimately supportable by the evidence you have at your disposal.
- 4) **Decide on the Grade You Will Argue For**. You now decide which of the two grade criteria most accurately describes your work and you then set out on the task of making the case for that grade as clearly as you can. You are now ready to start writing.

The Writing Phase

- 5) **The Introduction**. Write an introduction to your paper in which you explain your understanding of what critical thinking is and how it involves certain component understandings, skills, and traits, as well as how it requires getting beyond certain obstacles and natural tendencies.
- 6) Demonstrate Your Understanding of the Criteria for the Grade You Will Argue For. Write out your understanding of the criteria for the grade you are going to argue for, demonstrating that you have carefully thought through those criteria.
- 7) **Explain Your Evidence-Gathering Strategy**. Explain in a broad way the nature of the evidence you are going to present, how you "gathered" that evidence (how you decided what to include and what not to include), and what specifically you think that evidence shows (here, as always, it is important to be clear and precise).
- 8) **Present Your Evidence in an Organized Way**. Now you begin to actually present specific evidence explaining exactly what you think each "bit" of evidence shows or demonstrates. (Before you present the evidence, think through in what order you are going to present the evidence and why. Show the reader you have thought this through and that you are not just throwing stuff together helter-skelter.)
- 9) Summarize Your Case and What it Shows. Once you have presented all the evidence, and all of your commentary on the evidence that you think necessary to justify your conclusion (that your work matches the criteria for A, B, C, D, or F), then write a summary section. In the summary section, tie everything in the paper together for the reader, so that she/he has a good sense of what has been done, what has not been done, and where matters finally stand.

Recommendations For Departmental Self-Evaluation

Each department should consider using the model below as the starting point for a self-evaluation that will maximize the integration of instruction:

Work together as a department to characterize the basic mode of thinking integral to your field. Then elaborate what is involved (crucially) in that thinking. Spell this out in an integrated way as it might be manifested in a student successfully completing your program, as in the examples below. Then contextualize that description for representative courses in the program or department.

Model Description

Students successfully completing a major in will demonstrate a range of thinking skills and abili-
ties which they use in the acquisition of knowledge. Their work at the end of the program will be clear, pre-
cise, and well-reasoned. They will demonstrate in their thinking command of the key terms and
distinctions, the ability to identify and solve fundamental problems. Their work will demonstrate a mind
in charge of its own ideas, assumptions, inferences, and intellectual processes. They will demonstrate
the ability to analyze questions and issues clearly and precisely, formulate information accurately,
distinguish the relevant from irrelevant, recognize key questionable assumptions, use key concepts
effectively, use language in keeping with established professional usage, identify relevant competing
points of view, and reason carefully from clearly stated premises, as well as sensitivity to important
implications and consequences. They will demonstrate excellent reasoning and problem-solving.

Example: History Department

Students successfully completing a major in History will demonstrate a range of historical thinking skills and abilities which they use in the acquisition of knowledge. Their work at the end of the program will be clear, precise, and well-reasoned. They will demonstrate in their thinking, command of the key historical terms and distinctions, the ability to identify and solve fundamental historical problems. Their work will demonstrate a mind in charge of its own historical ideas, assumptions, inferences, and intellectual processes. They will demonstrate the ability to analyze historical questions and issues clearly and precisely, formulate historical information accurately, distinguish the relevant from irrelevant, recognize key questionable historical assumptions, use key historical concepts effectively, use historical language in keeping with established professional usage, identify relevant competing historical points of view, and reason carefully from clearly stated historical premises, as well as sensitivity to important historical implications and consequences. They will demonstrate excellent historical reasoning and problem-solving.

The Biology Department

Students successfully completing a major in Biology will demonstrate a range of biological thinking skills and abilities which they use in the acquisition of biological knowledge. Their work at the end of the program will be clear, precise, and well-reasoned. They will demonstrate in their thinking, command of the key biological terms and distinctions, the ability to identify and solve fundamental biological problems. Their work will demonstrate a mind in charge of its own biological ideas, assumptions, inferences, and intellectual processes. They will demonstrate the ability to analyze biological questions and issues clearly and precisely, formulate biological information accurately, distinguish the relevant from irrelevant, recognize key questionable biological assumptions, use key biological concepts effectively, use biological language in keeping with established professional usage, identify relevant competing biological points of view, and reason carefully from clearly stated biological premises, as well as sensitivity to important biological implications and consequences. They will demonstrate excellent biological reasoning and problem-solving.

Philosophy Department

Students successfully completing a major in Philosophy will demonstrate a range of philosophical thinking skills and abilities which they use in the acquisition of philosophical knowledge. Their work at the end of the program will be clear, precise, and well-reasoned. They will demonstrate in their thinking, command of the key philosophical terms and distinctions, the ability to identify and solve fundamental philosophical problems. Their work will demonstrate a mind in charge of its own philosophical ideas, assumptions, inferences, and intellectual processes. They will demonstrate the ability to analyze philosophical questions and issues clearly and precisely, formulate philosophical information accurately, distinguish the relevant from irrelevant, recognize key questionable philosophical assumptions, use key philosophical concepts effectively, use philosophical language in keeping with established professional usage, identify relevant competing philosophical points of view, and reason carefully from clearly stated philosophical premises, as well as sensitivity to important philosophical implications and consequences. They will demonstrate excellent philosophical reasoning and problem-solving.

Mathematics Department

Students successfully completing a major in Mathematics will demonstrate a range of mathematical thinking skills and abilities which they use in the acquisition of mathematical knowledge. Their work at the end of the program will be clear, precise, and well-reasoned. They will demonstrate in their thinking, command of the key mathematical terms and distinctions, the ability to identify and solve fundamental mathematical problems. Their work will demonstrate a mind in charge of its own mathematical ideas, assumptions, inferences, and intellectual processes. They will demonstrate the ability to analyze mathematical questions and issues clearly and precisely, formulate mathematical information accurately, distinguish the relevant from irrelevant, recognize key questionable mathematical assumptions, use key mathematical concepts effectively, use mathematical language in keeping with established professional usage, identify relevant competing mathematical points of view, and reason carefully from clearly stated mathematical premises, as well as sensitivity to important mathematical implications and consequences. They will demonstrate excellent mathematical reasoning and problem-solving.

Music Department

Students successfully completing a major in Music will demonstrate a range of musical thinking skills and abilities which they use in the acquisition of musical knowledge. Their work at the end of the program will be clear, precise, and well-reasoned and well-performed. They will demonstrate in their musical thinking and performance, command of the key musical terms and distinctions, the ability to identify and solve fundamental musical problems. Their work will demonstrate a mind in charge of its own musical ideas, assumptions, inferences, and intellectual processes, as well as musical performance. They will demonstrate the ability to analyze musical questions and issues clearly and precisely, formulate musical information accurately, distinguish the relevant from irrelevant, recognize key questionable musical assumptions, use key musical concepts effectively, use musical language in keeping with established professional usage, identify relevant competing musical points of view, and reason carefully from clearly stated musical premises, as well as sensitivity to important musical implications and consequences. They will demonstrate excellent musical reasoning, problem-solving, and performance.

Sample Course: American History: 1600-1800

Purpose:

The purpose of the course is to think historically about the major trends and patterns in American History, 1600-1800.

Key Question:

What are the major patterns & trends in American History, 1600-1800?

Information:

The students will work with a variety of primary and secondary sources of information: records, diaries, letters, biographies, newspapers, and historical accounts from textbooks and articles.

Skills of Interpretation:

The students will learn how to gather and interpret data from a variety of historical sources.

Essential Concepts:

The students will need to learn how to use basic historical, economic, political, religious concepts, as well as those from social life and values.

Assumptions:

The fundamental assumption behind this course is that it is possible for entry level students to gain insight into the patterns and events in American life, 1600-1800, that shed light on contemporary problems.

Implications:

Students who reason well about events in 17th and 18th Century American life should be able to see connections with events in the 20th Century.

Point of View:

Students will learn how to reason as both a conservative and liberal historian, integrating economic, political, and social analysis.

The General Plan For the Course:

The course will be designed so that on a typical day students will be engaged in historical reasoning about crucial questions regarding major trends and patterns by using primary and secondary sources (interpreting the significance and meaning of that information). They will work in groups on those questions but will write up individual papers. Once completed, their individual papers will be assessed by student groups which will make specific recommendations for improvement based on criteria focused on the variables that affect the quality of historical reasoning. Their final grade will be determined by the professor by grading 3 papers chosen at random from their portfolio.

School-Wide Grading Standards

The text below defines the outlines of the standards for the grades of A, B, C, D, and F. These standards are suggestive of common denominator academic values and must be contextualized at two levels: at the department level (to capture domain-specific variations) and at the course level (to capture course-specific differences).

High Level Performance

High level performance implies excellence in thinking and performance within the domain of a subject and course, along with the development of a range of knowledge acquired through the exercise of thinking skills and abilities. A level work is, on the whole, not only clear, precise, and well-reasoned, but insightful as well. Basic terms and distinctions are learned at a level which implies insight into basic concepts and principles. The A-level student has internalized the basic intellectual standards appropriate to the assessment of his/her own work in a subject and demonstrates insight into self-evaluation. The A-level student often raises important questions and issues, analyzes key questions and problems clearly and precisely, recognizes key questionable assumptions, clarifies key concepts effectively, uses language in keeping with educated usage, frequently identifies relevant competing points of view, and demonstrates a commitment to reason carefully from clearly stated premises in the subject, as well as marked sensitivity to important implications and consequences. A-level work displays excellent reasoning and problem-solving within a field and works consistently at a high level of intellectual excellence.

The Grade of B

The grade of B implies sound thinking and performance within the domain of a subject and course, along with the development of a range of knowledge acquired through the exercise of thinking skills and abilities. B level work is, on the whole, clear, precise, and well-reasoned., but does not have depth of insight. Basic terms and distinctions are learned at a level which implies comprehension of basic concepts and principles. The B-level student has internalized some of the basic intellectual standards appropriate to the assessment of his/her own work in a subject and demonstrates competence in self-evaluation. The B-level student often raises questions and issues, analyzes questions and problems clearly and precisely, recognizes some questionable assumptions, clarifies key concepts competently, typically uses language in keeping with educated usage, sometimes identifies relevant competing points of view, and demonstrates the beginnings of a commitment to reason carefully from clearly stated premises in a subject, as well as some sensitivity to important implications and consequences. B-level work displays sound reasoning and problem-solving with in a field and works consistently at a competent level of intellectual performance.

The Grade of C

The grade of C implies mixed thinking and performance within the domain of a subject and course, along with some development of a range of knowledge acquired through the exercise of thinking skills and abilities. C level work is inconsistently clear, precise, and well-reasoned; moreover, it does not display depth of insight or even consistent competence. Basic terms and distinctions are learned at a level which implies the beginnings of, but inconsistent comprehension of, basic concepts and principles. The C-level student has internalized a few of the basic intellectual standards appropriate to the assessment of his/her own work in a subject, but demonstrates inconsistency in self-evaluation. The C-level student sometimes raises questions and issues, sometimes analyzes questions and problems clearly and precisely, recognizes some questionable assumptions, clarifies some concepts competently, inconsistently uses language in keeping with educated

usage, sometimes

identifies relevant competing points of view, but does not demonstrate a clear commitment to reason carefully from clearly stated premises in a subject, nor consistent sensitivity to important implications and consequences. C-level work displays inconsistent reasoning and problem-solving within a field and works, at best, at a competent level of intellectual performance.

The Grade of D

The grade of D implies poor thinking and performance within the domain of a subject and course. On the whole, the student tries to get through the course by means of rote recall, attempting to acquire knowledge by memorization rather than through comprehension and understanding. The student is not developing critical thinking skills and understandings as requisite to understanding course content. D-level work represents thinking that is typically unclear, imprecise, and poorly reasoned. The student is achieving competence only on the lowest order of performance. Basic terms and distinctions are often incorrectly used and reflect a superficial or mistaken comprehension of, basic concepts and principles. The D-level student has not internalized the basic intellectual standards appropriate to the assessment of his/her own work in a subject and does poorly in self-evaluation. The D-level student rarely raises questions and issues, superficially analyzes questions and problems, does not recognize his/her assumptions, only partially clarifies concepts, rarely uses language in keeping with educated usage, rarely identifies relevant competing points of view, and shows no understanding of the importance of a commitment to reason carefully from clearly stated premises in a subject. The D-level student is insensitive to important implications and consequences. D-level work displays poor reasoning and problem-solving within a field and works, at best, at a low level of intellectual performance.

The Grade of F

The student tries to get through the course by means of rote recall, attempting to acquire knowledge by memorization rather than through comprehension and understanding. The student is not developing critical thinking skills and understandings as requisite to understanding course content. F-level work represents thinking that is regularly unclear, imprecise, and poorly reasoned. The student is not achieving competence in his/her academic work. Basic terms and distinctions are regularly incorrectly used and reflect a mistaken comprehension of, basic concepts and principles. The F-level student has not internalized the basic intellectual standards appropriate to the assessment of his/her own work in a subject and regularly mis-evaluates his/her own work. The F-level student does not raise questions or issues, does not analyze questions and problems, does not recognize his/her assumptions, does not clarify concepts, does not use language in keeping with educated usage, confuses his/her point of view with the TRUTH, and shows no understanding of the importance of a commitment to reason carefully from clearly stated premises in a subject. The F-level student is oblivious to important implications and consequences. F-level work displays incompetent reasoning and problem-solving within a field and consistently poor intellectual performance.

Class Syllabus Critical Thinking Team Teaching: Richard Paul and Linda Elder

The Key Concept of the Course

This course is entirely and exclusively concerned with the development of potential capacities that all of you have, even though you have not developed them, capacities in that part of your mind known as "your intellect". Most people don't develop their intellect and use it very ineffectively and often mainly to rationalize or justify their infantile or egocentric drives. One way to put this point is to say that most people are not in charge of their ideas and thinking. Most of their ideas have come into their minds without their having thought about it. They unconsciously pick up what the people around them think. They unconsciously pick up what is on television or in the movies. They unconsciously absorb ideas from the family they were raised in. They are the products, through and through, of forces they did not choose. They reflect those forces without understanding them. They are like puppets who don't know that they have strings being pulled.

To become a critical thinker is to reverse that process, by learning to practice skills that enable one to start to take charge of the ideas that run one's life. It is to think consciously and deliberately and skillfully in ways that transform oneself. It is to begin to remake one's own mind. It is to run for the first time one's inner workings and to understand the "system" one is running. It is to develop a mind that is analogous to the body of a person that is physically fit. It is like an excellent dancer who can perform any dance that can be choreographed. It is like a puppet that discovers the strings, and figures out how to gain control of the way they are pulled.

Whenever you are doing a task in or for the class, ask yourself, would an independent observer watching you closely conclude that you were engaged in "taking charge of your mind, of your ideas, of your thinking" or would such a person conclude that you were "merely going through the motions of formally doing an assignment", trying to get by with some rotely memorized formula or procedure?

The General Plan

The class will focus on practice not on lecture. It will emphasize your figuring out things using your own mind, not memorizing what is in a textbook. On a typical class day you will be in small groups practicing "disciplined" thinking. You will be regularly responsible for assessing your own work using criteria and standards discussed in class. If at any time in the semester you feel unsure about your "grade", you should request an assessment from the professor.

For every class day you will have a written assignment which involves "disciplined" thinking. Out of class you will enter disciplined reflections into in a journal, using a special format.

Requirements

All students must complete all of the following:

- 1) <u>27 short written assignments</u>, one due for every class day. Each of these must be computer-generated—so that you can easily revise them. If your assignment for the day is not completed, then you are not prepared to do the "in-class" work of the day and you will be asked to leave.
- 2) 20 journal entries, all in a special format.
- 3) An oral exam. This is a mastery exam. All entries must be passed to pass the exam.
- 4) A final exam.

- 5) <u>A Self-Evaluation</u>, in which you "make a case" for receiving a particular grade using criteria provided in class and citing evidence from your work across the semester.
- 6) Consistent classroom attendance and active, skilled participation.

Grading

The class will not be graded on a curve. It is theoretically possible for the whole class to get an A or an F. You will not be competing against each other and there will be every incentive to help each other improve. No letter grades will be given before the final grade—unless you make a specific request to the professor. You should focus on improving your performance, increasing your strengths and diminishing your weaknesses, not in looking for a grade.

- Final Exam: about 20%
- Out of class writing: about 30 %
- Self-evaluation: about 25%
- · Active, Skilled Participation: about 10 %
- Journal: about 15%
- <u>Penalty for Missed Classes</u>: You may miss two classes without receiving any formal penalty (though it is clearly in your interest to attend every class and participate actively). Every two unexcused absences after the first two results in a 1/3 of a grade penalty (Hence, with four absences: if your final grade would have been C+, it would be reduced to a C; if C- it would be reduced to D+). Attendance is taken by way of "stamped in" class assignments.

Since the final grade is not based on points and is not mathematically calculated, the above percentages are approximations to suggest emphasis, not precise figures. In assigning your final grade the professor will lay all of your work out before him and match your work as a whole against the criteria passed out in class. You should read and re-read these criteria many times through-out the semester to ensure that you are clear about what you are striving to achieve.

Reading Resource

There is a book available to serve as a background reader for the concepts of the course. Once in a while assignments may be made in it, but for the most part it will be used for readings that will help you learn some of the basic concepts implicit in the course. The Book, Critical Thinking: What Every Person Needs to Survive in a Rapidly Changing World, retails for \$25. but is being made available for \$15 only to registered members of the course. Books will be available for this price simply once in class. You will have to pay in cash or with a check made out to The Foundation For Critical Thinking. At the final exam you may sell the book back for \$8, making your cost for the semester only \$7.

Critical Thinking (R. Paul & L. Elder) Student Understandings

1)	I understand that there are intellectual standards in this course and that I am responsible for monitoring my own learning.	
2)	I understand that the class will focus on practice not on lecture	
3)	I understand on a typical class day I will be working in a small group and that I will be responsible take an active part in advancing the assigned work of the group	
4)	I understand that I will be held regularly responsible for assessing my own work using criteria and standards discussed in class	
5)	I understand that if at any time in the semester I feel unsure about my "grade", I may request an assessment from the instructor(s)	
6)	I understand that I must keep a journal, using a special format and including 20 entries in the course of the semester	
7)	I understand that there are 27 short written assignments, one due for several class days.	
8)	I understand that if an assignment is due for a class day and it is not completed, then I am not prepared to do the "in-class" work of the day and will be asked to leave. I also understand that I may return to class once the assignment is completed	
9)	I understand that there is an <u>oral exam</u> that is a mastery exam. I understand that all entries must be passed to pass the course	
10)	I understand that there is a final exam in the course	
11)	I understand that I must do <u>A Self-Evaluation</u> , in which I "make a case" for receiving a particular grade using criteria provided in class and citing evidence from my work across the semester	
12)	I understand that the work of the course requires <u>Consistent classroom attendance</u> and active participation	
13)	I understand that the class will not be graded on a curve. I understand that it is theoretically possible for the whole class to get an A or an F	
14)	I understand the basis of the final grade as outlined in the syllabus	
15)	I understand that since the final grade is not based on points and is not mathematically calculated, the percentages outlined in the syllabus are approximations to suggest emphasis, not precise figures In assigning my final grade the professor will lay all of my work out before her and match my work as a whole against the criteria passed out in class and using the weighting above	
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Grading Policies

Critical Thinking Richard Paul & Linda Elder

The goal of writing assignments is to practice critical thinking and to amass evidence of your critical thinking ability

"Evidence" is something that makes something else "evident". It "demonstrates" or "shows" or "reveals" something. The key question is "What specifically does your philosophical writing demonstrate about your ability to reason?"

For Example:

- When you write sentences that can be interpreted in many different ways (and you do not make clear which meaning you intend), you demonstrate that you are writing, and presumably, thinking in a vague way.
- When you do not give concrete examples and illustrations to make your point clear, you demonstrate that you do not know how to clarify your thought (or for some reason have chosen not to).
- When you do not make clear—with appropriate transitional words and critical vocabulary—the logical relations between the sentences you write, you make evident that you are not thinking in terms of the logic of your thought, that you do not fully understand the structure of your own reasoning.
- When you do not analyze key concepts and demonstrate how to lay bare the logic of them, you make evident that you are weak at conceptual analysis.
- When you do not make clear the question or issue you are dealing with or drift (for no apparent reason) from one issue to another, you reveal that you lack the intellectual discipline and focus to appreciate what each issue you raise requires of you. You demon strate that you lack a sense of relevance.
- When you make sweeping judgments about a philosophical position that you have not sufficiently analyzed empathetically, you demonstrate intellectual arrogance.

The Weighting of Papers in the Portfolio:

The semester will be divided into thirds. At the end of the course, to determine your grade on the portfolio, I will grade one paper randomly chosen from the first third, two from the second third, and three from the final third. At any point in the course you may turn in your portfolio for grade-level assessment. However, if you are routinely assessing your own work—as critical thinking requires—you should be able to recognize the level at which you are performing.

What Each Grade Represents

The Grade of F

(The essence of F-level work is that the student demonstrated a pattern of uncritical thinking and/or failed to do the required work of the course). Here are typical characteristics of the work of a student who receives an F. A close examination reveals: The student does not understand the basic nature of critical thinking, and in any case does not display the critical thinking skills and abilities which are at the heart of this course. The work at the end of the course is vague, imprecise, and unreasoned as it was in the

beginning. There is little evidence that the student is genuinely engaged in the task of taking charge of his or her thinking. Many assignments appear to have been done pro forma, the student simply going through the motions without really putting any significant effort into thinking his or her way through them. Consequently, the student is not analyzing issues clearly, not formulating information clearly, not accurately distinguishing the relevant from the irrelevant, not identifying key questionable assumptions, not clarifying key concepts, not identifying relevant competing points of view, not reasoning carefully from clearly stated premises, or tracing implications and consequences. The students work does not display discernable reasoning and problem-solving skills.

The Grade of D

(The essence of D-Level work is that it demonstrates only a minimal level of understanding and skill in critical thinking). D level work shows only a minimal level of understanding of what critical thinking is, along with the development of some, but very little, critical thinking skills or abilities. D work at the end of the course, on the whole, shows only occasional critical thinking skills, but frequent uncritical thinking. Most assignments are poorly done. There is little evidence that the student is "reasoning" through the assignment. Often the student seems to be merely going through the motions of the assignment, carrying out the form without getting into the spirit of it. D work rarely shows any effort to take charge of ideas, assumptions, inferences, and intellectual processes. In general, D-level thinking lacks discipline and clarity. In D-level work, the student rarely analyzes issues clearly and precisely, almost never formulates information clearly, rarely distinguishes the relevant from the irrelevant, rarely recognizes key questionable assumptions, almost never clarifies key concepts effectively, frequently fails to use language in keeping with educated usage, only rarely identifies relevant competing points of view, and almost never reasons carefully from clearly stated premises, or recognizes important implications and consequences. D-level work does not show good reasoning and problem-solving skills and frequently displays poor reasoning and problem-solving skills.

The Grade of C

(The essence of C-level work is that it demonstrates more than a minimal level of skill, but it is also highly inconsistent, with as many weaknesses as strengths). C-level work illustrates some but inconsistent achievement in grasping what critical thinking is, along with the development of modest critical thinking skills or abilities. C-level work at the end of the course, it is true, shows some emerging critical thinking skills, but also pronounced weaknesses as well. Though some assignments are reasonably well done, others are poorly done; or at best are mediocre. There are more than occasional lapses in reasoning. Though critical thinking terms and distinctions are sometimes used effectively, sometimes they are used quite ineffectively. Only on occasion does C-level work display a mind taking charge of its own ideas, assumptions, inferences, and intellectual processes. Only occasionally does C-level work display intellectual discipline and clarity. The C-level student only occasionally analyzes issues clearly and precisely, formulates information clearly, distinguishes the relevant from the irrelevant, recognizes key questionable assumptions, clarifies key concepts effectively, uses language in keeping with educated usage, identifies relevant competing points of view, and reasons carefully from clearly stated premises, or recognizes important implications and consequences. Sometimes the C-level student seems to be simply going through the motions of the assignment, carrying out the form without getting into the spirit of it. On the whole, C-level work shows only modest and inconsistent reasoning and problem-solving skills and sometimes displays weak reasoning and problem-solving skills.

The Grade of B

(The essence of B-level work is that it demonstrates more strengths than weaknesses and is more consistent in high level performance that C-level work. It nevertheless has some distinctive weak-

nesses, though no major ones). B-level work represents demonstrable achievement in grasping what critical thinking is, along with the clear demonstration of a range of specific critical thinking skills or abilities. B-level work at the end of the course is, on the whole, clear, precise, and well-reasoned, though with occasional lapses into weak reasoning. On the whole, critical thinking terms and distinctions are used effectively. The work demonstrates a mind beginning to take charge of its own ideas, assumptions, inferences, and intellectual processes. The student often analyzes issues clearly and precisely, often formulates information clearly, usually distinguishes the relevant from the irrelevant, often recognizes key questionable assumptions, usually clarifies key concepts effectively, typically uses language in keeping with educated usage, frequently identifies relevant competing points of view, and shows a general tendency to reason carefully from clearly stated premises, as well as noticeable sensitivity to important implications and consequences. B-level work displays good reasoning and problem-solving skills.

The Grade of A

(The essence of A-level work is that it is excellent overall, with no major weaknesses). A-level work demonstrates real achievement in grasping what critical thinking is, along with the clear development of a range of specific critical thinking skills or abilities. The work at the end of the course is, on the whole, clear, precise, and well-reasoned, though with occasional lapses into weak reasoning. In A-level work, critical thinking terms and distinctions are used effectively. The work demonstrates a mind beginning to take charge of its own ideas, assumptions, inferences, and intellectual processes. The A-level student usually analyzes issues clearly and precisely, usually formulates information clearly, usually distinguishes the relevant from the irrelevant, usually recognizes key questionable assumptions, usually clarifies key concepts effectively, typically uses language in keeping with educated usage, frequently identifies relevant competing points of view, and shows a general tendency to reason carefully from clearly stated premises, as well as noticeable sensitivity to important implications and consequences. A-level work displays excellent reasoning and problem-solving skills. The A student's work is consistently at a high level of intellectual excellence.

Critical Thinking

Critical Thinking is the art of taking control of one's thinking. As such it means continually bringing thinking to the conscious level, followed by assessing it for quality, identifying its flaws, and then reconstructing it.

If I am thinking critically, I understand the importance of routinely taking my thinking apart and assessing it using universal intellectual standards.

The primary barrier to the development of critical thinking is our native egocentrism.

Human beings continually reason. Every part of our lives are influenced by how well we reason. Therefore learning to reason better and to better understand the reasoning of others is the key to improving the quality of our lives. We do this through critical thinking.

Thus the goal for the course was to design deep structures so that students would begin the life-long process of taking command of their minds.

Journal Entries

- 1) Describe in detail a **significant** situation you were in or are in presently.
- 2) Describe your emotional reaction to the situation.
- 3) Analyze your reaction to the situation.
- 4) What can you learn from your analysis (implications)?

Criteria for Evaluating Reasoning

- 1. Purpose: Is the purpose well-stated? Is it clear and justifiable?
- 2. **Question**: Is the question at issue well-stated? Is it clear and unbiased? Does the expression of the question do justice to the complexity of the matter at issue? Are the question and purpose directly relevant to each other?
- 3. **Information**: Does the writer cite relevant evidence, experiences, and/or information essential to the issue? Is the information accurate? Does the writer address the complexities of the issue?
- 4. **Concepts**: Does the writer clarify key concepts when necessary? Are the concepts used justifiably?
- 5. **Assumptions**: Does the writer show a sensitivity to what he or she is taking for granted or assuming? (Insofar as those assumptions might reasonably be questioned?) Does the writer use questionable assumptions without addressing problems which might be inherent in those assumptions?
- 6. **Inferences**: Does the writer develop a line of reasoning explaining well how s/he is arriving at her or his main conclusions?
- 7. **Point of View**: Does the writer show a sensitivity to alternative relevant points of view or lines of reasoning? Does s/he consider and respond to objections framed from other relevant points of view?
- 8. **Implications**: Does the writer show a sensitivity to the implications and consequences of the position s/he is taking?

A Sample Assignment Format

Directions

This assignment is designed to assess your critical thinking problem solving, and communication skills. Your answer will be judged for its clarity, relevance, coherence, logic, depth, consistency, and fairness. More specifically, the reader will be asking the following questions:

- 1) Is the question at issue well stated? Is it clear and unbiased? Does the expression of the question do justice to the complexity of the matter at issue?
- 2) Does the writer cite relevant evidence, experiences, and/or information essential to the issue?
- 3) Does the writer clarify key concepts when necessary?
- 4) Does the writer show a sensitivity to what he or she is assuming or taking for granted? (Insofar as those assumptions might reasonably questioned)?
- 5) Does the writer develop a definite line of reasoning, explaining well how he or she is arriving at his or her conclusions?
- 6) Is the writer's reasoning well- supported?
- 7) Does the writer show a sensitivity to alternative points of view or lines of reasoning? Does he or she consider and respond to objections framed from other points of view?
- 8) Does the writer show a sensitivity to the implications and consequences of the position he or she has taken?

Issue #1: Ecology

The nation is facing a variety of ecological problems that have the following general form: an established practice, whether on the part of business and industry or on the part of the public, is contributing to serious health problems for a large number of people. At the same time it would be costly to modify the practice so as to reduce the health problem. People often say that the answer is one of achieving a "balance" between the amount of money we spend to correct the problem and the number of lives we would save by that expenditure. Develop a point of view and some plausible criteria for telling how one would determine this "balance." Make sure you address any dilemmas inherent in your strategy for solving such problems.

Issue #2: Politics

There is a growing number of Americans who do not vote in national and local elections. Many of them explain their non-participation by saying that their vote would not make a difference. Some go on to argue that this is true because "money plays such a large role in elections that the candidate with the highest paid, and the highest quality, media campaign wins." Most people agree that money sometimes plays an inappropriate role in determining the outcome of elections. Develop a proposed solution to this problem that takes into account the view that people and organizations with money have a right to use that money to advance political causes they believe in. If you like, you may decide to develop a position to the effect that there is no solution to the problem and that we have no choice but to accept the status quo.

Issue #3: Morality

Sociologist Erving Goffman has pointed out that all social groups, including professions, develop a protective attitude toward members of their group, even when what some of the members do is seen as morally wrong. A sense of loyalty to the group often overrides what they would otherwise deem immoral. Consider the arguments for and against exposing people with whom you are personally close or with whom you have close professional ties. Develop a position on this issue that could serve as a guide for anyone in such a position.

Class Syllabus Psychology 1 (Linda Elder)

Key Concept of Course:

This course is designed to help you learn the logic of psychology. Everything we do this semester will in some way, either broadly or narrowly, relate to improving your understanding of and thinking critically about psychological principles, theories, practice, and application. The primary goal is for you to come to think as a psychologist would think. This includes identifying and working through problems which psychologists address. The course will focus on the different types of psychologists, the different schools of psychological thought, the varying work that is done by psychologists. The course will also focus on psychological processes, both conscious and unconscious, which influence the behavior and thinking of human beings.

To think deeply about the field of psychology, one must think clearly about the questions which face psychologists, one must gather relevant and valid information which relates to those questions, one must accurately analyze the value of information gathered and one must understand the complexity of human nature.

General Course Plan

This course is designed much differently from most others you have been exposed to because you will be asked to think critically about the subject matter throughout the semester. All of our activities will focus on helping you to better understand the logic of psychology, and to come to think like a rational psychologist. You will be asked to continually engage your mind during class and while preparing for class. The textbook will be used as a general resource for the course. You will learn to connect the logic of psychology to the logic of your own thinking so that the subject becomes relevant to you. While you will learn some "facts" about psychology, they will be learned in the context of learning about the logic of psychology, rather than being memorized for test time.

You will be asked to bring some assignment to each class period, and each class period will build upon work done in the previous class period. Each student will actively participate in class sessions, as you are asked to continually process information by restating information, giving examples, offering alternate points of view, etc. You will also be involved in daily group work, self-assessment, and peer assessment. The ultimate goal is for you to learn to think critically about your thinking, so that you are able to accurately assess your strengths and weaknesses and to take charge of your thinking.

Exams:

There will be two exams. Each exam will be worth 100 points. Both exams will be essay in nature, where you will be required to think critically, using the knowledge you have learned, as you write answers to specific psychological questions.

Questions:

For each class session, you will be required to write the answer to a question posed at the end of each class period. The question may result from the class discussion or may be prepared in advance by the instructor. These questions will be discussed at the beginning of each class period in small groups. Your written answers/papers will often be assessed by your peers. At the beginning of each class period, your work will be stamped. Students who have not written the assignment will not be allowed to participate in the activity until they complete it. They will be asked to go to a designated table in the room to complete it.

Additional Assignments:

Throughout the semester you will be given assignments to be completed outside of class. The number of points for each assignment varies, but the total number of possible points on the assignments is 100.

Written Assignment:

Two written assignments must be turned in on the days indicated on the schedule. Prior to your doing this assignment, I will clarify for you, through sample articles, what is expected of you. These must be typed and double-spaced. Explicit instructions for the assignments are detailed below. This assignment stresses clarity and accuracy of thought. Use the following simple rules to improve your writing.

- a) Choose your words carefully so that you are precisely stating your ideas.
- b) If it is possible to cut a word out, always cut it out.
- c) Never use the passive when you can use the active.
- d) Never use a foreign phrase, a scientific word, or a jargon word if you can think of an every day equivalent.
- e) Ask someone to read a draft and find places where you have been unclear. If they say something is unclear, change it until they understand.

First Written Assignment:

You are to choose a psychology related article in which you are interested. You may either chose one from a collection I will bring to class, or from a journal. If you choose an article not from my collection, I need to approve it. Read the article so that you thoroughly understand it. Then write a paper that includes:

- 1) The main issue or problem the author is focusing on in this article.
- 2) The main purpose of the article.
- 3) The information being used by the author and its relationship to the main issue.
- 4) The conclusion(s) being drawn by the author.
- 5) The implications of the conclusion(s).
- 6) The main concepts being used in the article which relate to the main issue.
- 7) The point of view of the author.
- 8) The author's assumptions.

Once you have clearly established the author's logic as detailed in one though eight above, add the following to your paper:

- 9) Discuss the significance of the issue which is the focus of the article. Why is it important? On what do you base you assertions regarding its significance?
- 10) What potential problems do you see in the author's reasoning? What potential problems are there with the author's use of information? Does the information used appear relevant, significant, valid, and sufficient for the conclusions being drawn? Do you have enough information to determine whether the information is relevant, significant, valid?
- 11) What point of view is ignored by this author, or has not been considered in dealing with the issue?

Student Assessment of Papers

On the day the paper is due, students will be assigned to groups of three or four. Each group will receive the same number of papers as they have members in their group, to be assessed (but they will receive none of their own papers). Each group will assess the papers they are assigned, providing commentary on each criteria point listed below. The paper will then be returned to the students, with comments.

Assessment Criteria

Papers of the highest quality in this assignment will include the following:

- 1) Questions outlined above are answered clearly and precisely, with detail and/or examples to support each point appropriately.
- 2) The main issue and purpose are clearly stated.
- 3) A clear connection between the information used and the author's main issue is drawn. The author's use of information is made clear.
- 4) The concepts being used are made clear.
- 5) The implications actually follow from the conclusions, or any fallacies in the author's reasoning about the implications are clearly described.
- 6) The point of view and the author's assumptions are clearly stated. The assumptions described are all inclusive. In other words, the student writer has clearly and completely stated all the assumptions on which the author has based his reasoning.
- 7) The importance of the issue is clearly stated and well thought through, and supported with implications which accurately follow from conclusions.
- 8) Problems regarding the author's reasoning are clearly and accurately stated. All potential problems with the author's reasoning are included.
- 9) Opposing points of view are accurately included.

Second Written Assignment

Once the papers are assessed in groups, they will be returned to the writers to be rewritten. You will rewrite the paper, taking into account the group assessment, and modifying the paper for ultimate clarity and precision. You will submit this paper to me, along with the original paper and its assessment, for grading. I will use the same assessment criteria for grading as used in the group assessment process.

Grade Profiles Intro to Psychology Linda Elder

The Grade of F

F-level work fails to display an understanding of the basic nature of psychological thinking, and in any case does not display the psychological thinking skills and abilities which are at the heart of this course. The work at the end of the course is as vague, imprecise, and unreasoned as it was in the beginning. There is little evidence that the student is genuinely engaged in the task of taking charge of his or her psychological thinking. Many assignments appear to have been done pro forma, the student simply going through the motions without really putting any significant effort into thinking his or her way through them. Consequently, the student is not analyzing psychological issues clearly, not formulating psychological information accurately, not distinguishing relevant from irrelevant information, not identifying key questionable psychological assumptions, not clarifying key psychological concepts, not identifying relevant psychological competing points of view, not reasoning carefully from clearly stated premises, or tracing psychological implications and consequences. The students work does not display discernable psychological reasoning and problem-solving skills.

The Grade of D

D-level work shows only a minimal level understanding of what psychological thinking is, along with the development of some, but very little, psychological thinking skills or abilities. D work at the end of the course, on the whole, shows only occasional psychological thinking skills, but frequent uncritical psychological thinking. Most assignments are poorly done. There is little evidence that the student is "reasoning" through the assignment. Often the student seems to be merely going through the motions of the assignment, carrying out the form without getting into the spirit of it. D work rarely shows any effort to take charge of ideas, assumptions, inferences, and intellectual processes. In general, D-level thinking lacks discipline and clarity. In D-level work, the student rarely analyzes psychological issues clearly and precisely, almost never formulates psychological information accurately, rarely distinguishes the relevant from the irrelevant, rarely recognizes key questionable assumptions, almost never clarifies key psychological concepts effectively, frequently fails to use psychological language in keeping with established professional usage, only rarely identifies relevant competing psychological points of view, and almost never reasons carefully from clearly stated premises, or recognizes important implications and consequences. D-level work does not show good psychological reasoning and problem-solving skills and frequently displays poor reasoning and problem-solving skills.

The Grade of C

C-level work illustrates some but inconsistent achievement in grasping what psychological thinking is, along with the development of modest psychological thinking skills or abilities. C-level work at the end of the course, it is true, shows some emerging psychological thinking skills, but also pronounced weaknesses as well. Though some assignments are reasonably well done, others are poorly done; or at best are mediocre. There are more than occasional lapses in reasoning. Though psychological thinking terms and distinctions are sometimes used effectively, sometimes they are used quite ineffectively. Only on occasion does C-level work display a mind taking charge of its own ideas, assumptions, inferences, and intellectual processes. Only

occasionally does C-level work display intellectual discipline and clarity. The C-level student only occasionally analyzes psychological issues clearly and precisely, formulates psychological information accurately, distinguishes the relevant from the irrelevant, recognizes key questionable assumptions, clarifies key psychological concepts effectively, uses psychological language in keeping with established professional usage, identifies relevant psychological competing points of view, and reasons carefully from clearly stated premises, or recognizes important psychological implications and consequences. Sometimes the C-level student seems to be simply going through the motions of the assignment, carrying out the form without getting into the spirit of it. On the whole, C-level work shows only modest and inconsistent psychological reasoning and problem-solving skills and sometimes displays weak reasoning and problem-solving skills.

The Grade of B

B-level work represents demonstrable achievement in grasping what psychological thinking is, along with the clear demonstration of a range of specific psychological thinking skills or abilities. B-level work at the end of the course is, on the whole, clear, precise, and well-reasoned, though with occasional lapses into weak reasoning. On the whole, psychological terms and distinctions are used effectively. The work demonstrates a mind beginning to take charge of its own ideas, assumptions, inferences, and intellectual processes. The student often analyzes psychological issues clearly and precisely, often formulates psychological information accurately, usually distinguishes the relevant from the irrelevant, often recognizes key questionable assumptions, usually clarifies key psychological concepts effectively, typically uses psychological language in keeping with established professional usage, frequently identifies relevant psychological competing points of view, and shows a general tendency to reason carefully from clearly stated premises, as well as noticeable sensitivity to important implications and consequences. B-level work displays good psychological reasoning and problem-solving skills.

The Grade of A

A-level work demonstrates real achievement in grasping what psychological thinking is, along with the clear development of a range of specific psychological thinking skills or abilities. The work at the end of the course is, on the whole, clear, precise, and well-reasoned, though with occasional lapses into weak reasoning. In A-level work, psychological terms and distinctions are used effectively. The work demonstrates a mind beginning to take charge of its own ideas, assumptions, inferences, and intellectual processes. The A-level student usually analyzes psychological issues clearly and precisely, usually formulates psychological information accurately, usually distinguishes the relevant from the irrelevant, usually recognizes key questionable assumptions, usually clarifies key psychological concepts effectively, typically uses psychological language in keeping with established professional usage, usually identifies relevant competing psychological points of view, and shows a general tendency to reason carefully from clearly stated premises, as well as noticeable sensitivity to important implications and consequences. A-level work displays excellent psychological reasoning and problem-solving skills. The A student's work is consistently at a high level of intellectual excellence.

Tactical and Structural Recommendations

- 1) Design coverage so that students grasp more. Plan instruction so students attain organizing concepts that enable them to retain more of what you teach. Cover less when more entails that they learn less.
- 2) Speak less so that they think more. (When you do lecture....)
- 3) Don't be a mother robin—chewing up the text for the students and putting it into their beaks through lecture. Teach them instead how to read the text for themselves, actively and analytically. Focus, in other words, on how to read the text not on "reading the text for them".
- 4) Focus on fundamental and powerful concepts with high generalizability. Don't cover more than 50 basic concepts in any one course. Spend the time usually spent introducing more concepts applying and analyzing the basic ones while engaged in problem-solving and reasoned application.
- 5) Present concepts, as far as possible, in the context of their use as functional tools for the solution of real problems and the analysis of significant issues.
- 6) Develop specific strategies for cultivating critical reading, writing, speaking, and listening. Assume that your students enter your class—as indeed they do—with limited skills in these essential learning modalities.
- 7) Think aloud in front of your students. Let them hear you thinking, better, puzzling your way slowly through problems in the subject. (Try to think aloud at the level of a good student, not as a speedy professional. If your thinking is too advanced or proceeds too quickly, they will not be able to internalize it.)
- 8) Regularly question your students Socratically: probing various dimensions of their thinking: their purpose, their evidence, reasons, data, their claims, beliefs, interpretations, deductions, conclusions, the implications and consequences of their thought, their response to alternative thinking from contrasting points of view, and so on.
- 9) Call frequently on students who don't have their hands up. Then, when one student says something, call on other students to summarize in their own words what the first student said (so that they actively listen to each other).
- 10) Use concrete examples whenever you can to illustrate abstract concepts and thinking. Cite experiences that you believe are more or less common in the lives of your students (relevant to what you are teaching).
- 11) Require regular writing for class. But grade using random sampling to make it possible for you to grade their writing without having to read it all (which you probably won't have time for).
- 12) Spell out explicitly the intellectual standards you will be using in your grading, and why. Teach the students, as well as you can, how to assess their own work using those standards.
- 13) Break the class frequently down into small groups (of twos, threes, fours, etc.), give the groups specific tasks and specific time limits, and call on particular groups afterward to report back on what part of their task they completed, what problems occurred, how they tackled those problems, etc.
- 14) In general design all activities and assignments, including readings, so that students must think their way through them. Lead discussions on the kind of thinking that is required.
- 15) Keep the logic of the most basic concepts in the foreground, continually re-weaving new concepts into the basic ones. Talk about the whole in relation to the parts and the parts in relation to the whole.
- 16) Let them know what they're in for. On the first day of class, spell out as completely as possible what your philosophy of education is, how you are going to structure the class and why, why the students will be required to think their way through it, why standard methods of rote memorization will not work, what strategies you have in store for them to combat the strategies they use for passing classes without much thinking, etc.

Examples of Tactical Thinking

Problem 1. The students read the textbook poorly. They get little out of it.	Ideal 1. I want every student to get the basic meanings out of the textbook. I want them all to basically understand it.	Tactic 1. I will teach them how to read the textbook by modeling how to read it and giving them opportunities to compare their reading with mine. 2. I will choose who the "reporter"
2. When working in groups that will have to report, some students will leave it to someone else to report and won't really pay much attention.	2. I want everyone in a group to participate actively in group work.	will be and I will choose that person right before the report is due.
3. Students often ignore what other students say. That is, they don't listen to what other students have to say.	3. I want everyone to be carefully listening to anyone who speaks.	3. I often call on students to summarize in their own words what another student has said: "Judy, would you summarize what Jack just said."
4. Students often speak in vague terms and don't seem to know how to make their points clearly.	4. I want every student to understand how they can maximize the clarity of what he/she is saying.	4. I often ask students to elaborate what they have said in other words and to give us an example or illustration to help us.

Socratic Discussion

There are four directions in which thought can be pursued.

Conflicting Views

How does this student's thinking conflict with other points of view?

What would you say to someone who said that people basically want to accomplish things and learn about things, that people need to work and keep busy and feel that they contribute? Could there be other reasons why people seem lazy, like maybe people are afraid of messing up, and that's why they don't go out there and do stuff? Your history book is full of people who did things, worked hard, fought, and so on — how do you explain that?

Origin or Source

How did the student come to form this point of view?

What makes you say that? Have you always thought that? If not, What made you change your mind? Why did that change your mind?

A student's main point for example: "Most people are lazy."

Implications & Consequences

Where does this student's point take us, what follows from it?

If that's true, then should we let people be lazy? If not, how can we get people to do things? What makes some people different, not lazy? If most people are lazy because X, then most people must be X — is that true?

Support, Reasons, Evidence, & Assumptions

Can the student support his or her view with reasons or evidence?

Why do you think so? Are there certain kinds or groups of people that aren't lazy? Why are most people lazy? How do you know? How could we find out if that might be so? Do people chose to be lazy, or decide that it doesn't matter if they are lazy, or are they just that way naturally? Do you think most people think of themselves as lazy? Why?

Why Students - and Often Teachers Don't Reason Well

♦ The Ability to Reason: A Defining Feature of Humans

our capacity to reason is at the heart of all disciplined thinking. It explains how we alone of all the creatures of the earth have been able to develop full-fledged academic disciplines: biology, physics, botany, zoology, chemistry, geography, history, psychology, sociology, etc. We can go beyond immediate, instinctive reactions to reflective, reasoned responses precisely because we are able to develop small-scale and large-scale systems in which to intellectually operate and act. These systems enable us to mentally manipulate our possible responses to situations — to formulate them explicitly, to hold them at intellectual arm's length, to analyze and critique them, and to decide what their implications are for us. Let me explain.

We understand the various particulars of everyday life by constructing abstract models or systems that abridge and summarize their features. In simplest form, we call these models or systems ideas. For example, our abstract concept of a bird is a model or system for thinking about actual birds in order to make sense of their behavior — in contrast to the behavior, say, of cats, dogs, turtles, beetles, and people. As we construct these abstract systems or models, we are enabled to use the reasoning power of our minds to go beyond a bare unconceptualized noticing of things to the making of inward interpretations of them, and hence derivations from them. In short, our concepts provide our minds with systems in which to experience and think; our minds operate (reason) within them to invest the world we experience with meanings rich in implications and consequences. Much of this is done, of course, quite automatically and subconsciously.

I can reason to any number of conclusions as the result of my having one simple model for a thing. For example, if I recognize a creature to be a dog, I can quickly infer it will:

- · bark rather than meow or chirp
- · wag its tail when pleased
- · growl when irritated
- · be unable to fly
- · have no feathers
- · be unable to live under water
- · be carnivorous
- · need oxygen
- · have teeth
- · have paws rather than feet, etc.

This word ('dog') is part of a much larger logical map upon which our minds can move in virtue of our capacity to reason. As we act bodily in the world, we act intellectually in our minds. These intellectual moves guide our actions in the world. Without these maps and the capacity to locate particulars on them, we would either thrash about aimlessly or be paralyzed by the bewildering mystery of things and events before us. In every situation in our lives we "construct" a response that results from how we are modeling the situation in our minds.

Hence, put us in any situation and we start to give it meaning, to figure it out with the logical structures we have at our disposal. So quickly and automatically do we make inferences — as the result of the way we are modeling the situation in our minds — that we do not typically notice those inferences.

For example, we see dark clouds and infer rain. We hear the door slam and infer someone has arrived. We see a frowning face and infer the person is angry. Our friend is late and we infer she is being inconsiderate. We meet a tall boy and infer he is good at basketball, an Asian and infer he will be good at math. We read a book, and infer what the various sentences and paragraphs, indeed what the whole book, is saying. We listen to what people say, and make a continual series of inferences as to what they mean. As we write we make inferences as to what others will make of what we are writing. We make inferences as to the clarity of what we are saying, as to what needs further explanation, as to what needs exemplification or illustration. We could not do this without "logical structures" by means of which to draw our inferences.

Many of our inferences are justified and reasonable. But, of course, many are not. One of the most important critical thinking skills is the skill of noticing and reconstructing the inferences we make, so that the various ways in which we inferentially shape our experiences become more and more apparent to us. This skill, this sensitivity or ability, enables us to separate our experiences into analyzed parts. We learn to distinguish the raw data of our experience from our interpretations of those data (in other words, from the inferences we are making about them). Eventually we realize that the inferences we make are heavily influenced by our point of view and the assumptions we have made. This puts us in the position of being able to broaden the scope of our outlook, to see situations from more than one point of view, to become more openminded. This requires that we recognize our point of view as a "logical system" that guides our inferences, a system that we can exchange for another (an alternative point of view), depending on our assumptions.

Often, then, different people make different inferences because they bring to situations a different point of view. They see the data differently. Or, to put it another way, they have different assumptions about what they see. For example, if two people see a man lying in a gutter, one might infer, "There's a drunken bum." The other might infer, "There's a man in need of help." These inferences are based on different assumptions about the conditions under which people end up in gutters and these assumptions are connected to the point of view about people that each has formed. The first person assumes: "Only drunks are to be found in gutters." The second person assumes: "People lying in the gutter are in need of help." The first person may have developed the point of view that people are fundamentally responsible for what happens to them and ought to be able to take care of themselves. The second may have developed the point of view that the problems people have are often caused by forces and events beyond their control. The two are modeling the situation differently. They are using a different system for experiencing it.

In any case, if we want our students to become good reasoners, we must become concerned to help them begin to notice the inferences they are making, the assumptions they are basing those inferences on, and the point of view about the world they are taking — hence the systems in which they are thinking. To help our students do this, we need to give them clear examples of simple cases, and lots and lots of practice analyzing and reconstructing them. For example, we could display the above inferences in the following way:

Person One:
Situation: "A man is lying in the gutter."
Assumption: "Only bums lie in gutters."
Inference: "That man's a bum."

Person Two:
Situation: "A man is lying in the gutter."
Assumption: "Anyone lying in the gutter is in need of help."
Inference: "That man is in need of help."

Our goal of sensitizing students to the inferences they make and to the assumptions that underlie their thinking enables them to begin to gain command over their thinking (the way they are using logical structures to model the world). Of course, it may seem odd to put any effort into making explicit such obvious examples. In the harder instances, however, the value of the explication becomes more evident. In any case, because all human thinking is inferential in nature, and all inferences are embedded in a system, we cannot gain command of our thinking unless we can recognize, one way or another, the inferences embedded in it and the assumptions that underlie it.

Consider the way in which we plan and think our way through everyday events. We think of ourselves as washing up, eating our breakfast, getting ready for work, arriving on time, sitting down at our desks, making plans for lunch, paying bills, engaging in small talk, etc. Another way to put this is to say that we are continually interpreting our actions, giving them meanings — making inferences within a system we have created — about what is going on in our lives.

And this is to say that we must choose among a variety of possible systems for thinking about things. Again, consider some simple cases. As I am sitting in my easy chair, am I "relaxing" or "wasting time"? Am I being "determined" or "stubborn", or worse, "pig-headed"? Did I "join" the conversation or "butt in"? Is Jack "laughing with me" or "laughing at me"? Am I "helping him" or "being taken advantage of"? Every time I interpret my actions within one of these systems that each word in the language represents, every time I give them a meaning, I make one or more inferences on the basis of one or more assumptions within some point of view.

As humans we continually make assumptions about ourselves, our jobs, our mates, our children, about the world in general. We take some things for granted, simply because we can't always be questioning everything. Sometimes we take the wrong things for granted. For example, I run off to the store (assuming that I have enough money with me) and arrive to find that I have left my money at home. I assume that I have enough gas in the car only to find that I have run out. I assume that an item marked down in price is a good buy only to find that it was "marked up" before it was "marked down". I assume that it will not, or that it will, rain. I assume that my car will start when I turn the key and press the starter. I assume that I mean well in my dealings with others. We make hundreds of assumptions, use hundreds of concepts, make hundreds of inferences, without noticing that we are doing so. Most of them are quite sound and justifiable. Some however are not.

The question then becomes: "How can we teach our students to begin to recognize the inferences they are making, the assumptions they are basing those inferences on, and the point of view, the perspective on the

world that they are beginning to form?" That is, "How can we help students to recognize how they are reasoning about the world?"

♦ Our Students Are Not Learning to Reason Well

Though we are "logic-creating" and "logic-using" animals, we typically operate with little awareness of this fact. We create and apply logical systems without knowing that we are doing so. Our intellectual modeling of the world is done sub rosa, without mindfulness. It is small wonder, then, that we often reason poorly.

Imagine a ballet dancer improving her ballet without knowing that she is a dancer or how and when she is dancing. Imagine a chess player who does not know she is playing chess. Or a tennis player who does not know she is playing tennis. We can hardly imagine people developing these physical and intellectual abilities without high consciousness of how and what they are doing in the doing of it. Yet we expect students to develop the ability to reason well without any mindfulness of the nature of reasoning, the elements of reasoning, or the criteria for assessing reasoning. We expect students to become good reasoners, in other words, without any knowledge of the logic of reasoning. Not surprisingly our approach doesn't work. Most students are very poor reasoners.

What Does Research on Learning and Teaching Tell Us?

By any measure whatsoever, most students are not learning to reason well. A recent summary of research by Mary Kennedy regarding student learning and instruction at the K-12 level documents serious reasoning deficiencies on the part of students.

Important Research Findings

First Finding: "...national assessments in virtually every subject indicate that, although our students can perform basic skills pretty well, they are not doing well on thinking and reasoning. American students can compute, but they cannot reason.... They can write complete and correct sentences, but they cannot prepare arguments.... Moreover, in international comparisons, American students are falling behind...particularly in those areas that require higher-order thinking.... Our students are not doing well at thinking, reasoning, analyzing, predicting, estimating, or problem solving."

Second Finding: "...textbooks in this country typically pay scant attention to big ideas, offer no analysis, and pose no challenging questions. Instead, they provide a tremendous array of information or 'factlets', while they ask questions requiring only that students be able to recite back the same empty list."

Third Finding: "Teachers teach most content only for exposure, not for understanding.

Fourth Finding: "Teachers tend to avoid thought-provoking work and activities and stick to predictable routines."

Conclusion: "If we were to describe our current K-12 education system on the basis of these four findings, we would have to say that it provides very little intellectually stimulating work for students, and that it tends to produce students who are not capable of intellectual work."

Fifth Finding: "... our fifth finding from research compounds all the others and makes it harder to change practice: teachers are highly likely to teach in the way they themselves were taught. If your elementary teacher presented mathematics to you as a set of procedural rules

with no substantive rationale, then you are likely to think that this is what mathematics is and that this is how mathematics should be studied. And you are likely to teach it in this way. If you studied writing as a set of grammatical rules rather than as a way to organize your thoughts and to communicate ideas to others, then this is what you will think writing is, and you will probably teach it so.... By the time we complete our undergraduate education, we have observed teachers for up to 3,060 days."

Implication: "We are caught in a vicious circle of mediocre practice modeled after mediocre practice, of trivialized knowledge begetting more trivialized knowledge. Unless we find a way out of this circle, we will continue re-creating generations of teachers who re-create generations of students who are not prepared for the technological society we are becoming." (condensed from "Policy Issues in Teaching Education" by Mary Kennedy in the Phi Delta Kappan, May, 91, pp 661–66.)

♦ California State-Wide Test Fiasco: Teachers and Testers Who Don't Understand Reasoning

Before teachers will be able to help students to reason well, it is essential that they learn what reasoning is and how to assess it. A recent statewide test in California demonstrated that many teachers, and even some educational testing experts, have serious misunderstandings about the nature of reasoning and how to assess it.

The student essay below should have been graded at the lower rather than the higher end of the continuum of eight levels: "minimal evidence of achievement" or, at best, "limited evidence of achievement" rather than the highest grade of "exceptional achievement." For though the essay may have "flair and sparkle" (as one teacher expressed it), it is a poor example of evaluative reasoning, since it systematically confuses the objective goal of reasoned evaluation with the very different goal of explaining subjective preference, an important distinction in critical thinking which the teacher-evaluators apparently missed entirely.

Evaluative Essay Sample

Evaluation. Students were asked to write an evaluative essay, make judgments about the worth of a book, television program, or type of music and then support their judgments with reasons and evidence. Students must consider possible criteria on which to base an evaluation, analyze their subject in light of the criteria, and select evidence that clearly supports their judgments. Each student was assigned one of the following evaluative tasks:

- a) To write a letter to a favorite author telling why they especially liked one of the author's books.
- b) To explain why they enjoyed one television program more than any others.
- c) To justify their preference for a particular type of music.

The tasks made clear that students must argue convincingly for their preferences and not just offer unsupported opinions. This is a sample essay from a student who demonstrated exceptional achievement.

Rock Around the Clock

"Well, you're getting to the age when you have to learn to be responsible!" my mother yelled out.

"Yes, but I can't be available all the time to do my appointed chores! I'm only thirteen! I want to be with my friends, to have fun! I don't think that it is fair for me to baby-sit while you go run your little errands!" I snapped back. I sprinted upstairs to my room before my mother could start another sentence. I turned on my radio and "Shout" was playing. I noted how true the song was and I threw some punches at my pillow. The song ended and "Control" by Janet Jackson came on. I stopped beating my pillow. I suddenly felt at peace with myself. The song had slowed me down. I pondered briefly over all the songs that had helped me to control my feelings. The list was endless. So is my devotion to rock music and pop rock. These songs help me to express my feelings, they make me wind down, and above all they make me feel good. Without this music, I might have turned out to be a violent and grumpy person.

Some of my favorite songs are by Howard Jones, Pet Shop Boys, and Madonna. I especially like songs that have a message in them, such as "Stand by Me", by Ben E. King. This song tells me to stand by the people I love and to not question them in times of need. Basically this song is telling me to believe in my friends, because they are my friends.

My favorite type of music is rock and pop rock. Without them, there is no way that I could survive mentally. They are with me in times of trouble, and best of all, they are only a step away. (Source: California State Department of Education, 1988. Reprinted in, "California: The State of Assessment", Anderson, Robert L. Developing Minds, edited by Art Costa, pp. 314–25.

California classroom teachers wrote comments like these after reading and scoring students' evaluative essays:

- · "Evidence of clear thinking was heavily rewarded in our scoring."
- "I am struck by how much some students can accomplish in 45 minutes; how well they can sometimes marshal the ideas; and with how much flair and sparkle they can express themselves."
- "More emphasis should be placed on critical thinking skills, supporting judgments, and tying thoughts
 and ideas together. Far too many papers digress, summarize, underdevelop, or state totally irrelevant
 facts."
- "Students generally need to develop skills in giving evidence to support their judgments. I plan to spend more time on these thinking skills next year."

First of all, the instructions themselves are confused. They begin with a clear requirement of "objective" evaluation:

"Students were asked to write an evaluative essay, make judgments about the worth of a book, television program, or type of music and then support their judgments with reasons and evidence. Students must consider possible criteria on which to base an evaluation, analyze their subject in the light of the criteria, and select evidence that clearly supports their judgments."

Unfortunately, this request for reasoned evaluation is blended in the second half of the instruction with what might possibly be taken, with a little stretching and selective reading, as a request for the expression of a "subjective" preference:

Each student was assigned one of the following evaluative tasks: to write a letter to a favorite author telling why they especially liked one of the author's books, to explain why they enjoyed one television program more than any others, or to justify their preference for a particular type of music. The tasks made clear that students must argue convincingly for their preferences and not just offer unsupported opinions.

Let's look closely at this confusion. In the first place, there is still an emphasis on objective evaluation ("The tasks made clear that students must argue convincingly for their preferences and not just offer unsupported opinions") while the task itself is defined as the justification of a "preference."

Now most people prefer books, television programs, and types of music for fundamentally subjective, not objective, reasons. They like a particular book, television program, or song for no reason other than that they like it, that is, because they enjoy it or find pleasure in it or are interested or absorbed or excited or amused by it. Their reasons for liking what they like are not the result of an objective evaluation. They have no relation to the objective quality of what is judged. They are about the personal responses of the experiencer, not about the objective qualities of that which is experienced.

Most people, to take the point a step further, do not have "evidence" — other than the stuff of their subjective reactions — to justify their preferences. They prefer because of the way they feel not because of the way they reason. To choose because of these subjective states of feeling is precisely to lack criteria of evaluation or evidence that bears upon objective assessment. When challenged to support subjective preferences, people usually can do little more than repeat their subjective reactions ("I find it boring, amusing, exciting, dull, interesting, etc.") or rationalize them ("I find it exciting because it has a lot of action in it.")

A reasoned evaluation of a book, a program, or a type of music requires more than this; it requires some knowledge of the qualities of what we are evaluating and of the criteria appropriate to the evaluation of those qualities. One needs to be well-informed about books, about programs, about music if one is to claim to be in a position to objectively evaluate them. If one is not well-informed, one is unable to render a justified evaluative judgment, though one can always subjectively react and freely express one's subjective reactions as (mere) personal preferences. This is what the student (graded as having written an objective evaluation of "exceptional achievement") actually does. But his evaluators, not having this distinction clear in their own minds, completely miss the difference.

The sample student essay can, for analytic purposes, be divided into three parts. We shall comment briefly on each in turn. The first segment of the essay is an account of a highly emotional exchange between the student and his mother:

"Well, you're getting to the age when you have to learn to be responsible!" my mother yelled out. "Yes, but I can't be available all the time to do my appointed chores! I'm only thirteen! I want to be with my friends, to have fun! I don't think that it is fair for me to baby-sit while you run your little errands!" I snapped back. I sprinted upstairs to my room before my mother could start another sentence.

It is clear that in this segment there is no analysis, no setting out of alternative criteria, no clarification of the question at issue, no hint at reasoning or reasoned evaluation.

In the second part, the student makes a sweeping claim about a purported causal relationship between listening to rock music and his asserted, but unsupported, ability to control his emotions. He does not consider "possible criteria on which to base an evaluation." He does not present any evidence, though he does cite two examples, one where a song prompts him to punch his pillow and one where another song prompts him to stop. This gives little credence to the notion that rock music leads to his "controlling" his emotions. If anything, his examples seem to imply that, rather than learning control from, he is learning to be controlled by, the music he listens to. His major claim that "Without this music, I might have turned out to be a violent and grumpy person" is without reasoned or evidentiary support. He merely brashly asserts that it is true:

I turned on my radio and "Shout" was playing. I noted how true the song was and I threw some punches at my pillow. The song ended and "Control", by Janet Jackson came on. I stopped beating my pillow. I suddenly felt at peace with myself. The song had slowed me down. I pondered briefly over all the songs that had helped me to control my feelings. The list was

endless. So is my devotion to rock music and pop rock. These songs help me to express my feelings, they make me wind down, and above all they make me feel good. Without this music, I might have turned out to be a violent and grumpy person.

In the third, and final, section of the essay the student closes his remarks with a series of subjective, unsupported, even irrelevant statements:

Some of my favorite songs are by Howard Jones, Pet Shop Boys, and Madonna. I especially like songs that have a message in them, such as "Stand by Me", by Ben E. King. This song tells me to stand by the people I love and to not question them in time of need. Basically this song is telling me to believe in my friends, because they are my friends.

My favorite type of music is rock and pop rock. Without them, there is no way that I could survive mentally. They are with me in times of trouble, and best of all, they are only a step away.

If this is reasoning, it is very bad reasoning: "Believe in your friends because they are your friends", "If you feel you cannot survive without rock music, then it follows that you can't." Of course, a more appropriate interpretation of what is going on is that the student is not reasoning at all but merely asserting his subjective opinions. Consider, the student doesn't examine alternative criteria on which to base an evaluation of music. He doesn't analyze rock music in the light of evaluative criteria. He doesn't provide evidence that clearly supports his judgment. His writing is vague where it needs to be precise, logically rambling where it needs to be critically reasoned. We don't really know what he means by songs "controlling" his feelings. We are not provided with any evidence on the basis of which we could assess whether there is any truth in his sweeping claims about himself, for example, that he could not survive mentally without rock music. Indeed, common sense experience strongly suggests, we believe, that the student is simply deluding himself on this point, or, alternatively, engaging in unbridled hyperbole.

When a blatantly weak essay such as this is disseminated nationally as an example of "exceptional achievement" in the writing of a *reasoned* evaluative essay, then it is clear that there are large numbers of educators who are not clear about the assessment of reasoning. Remember, the California Assessment Program of the California State Department of Education is the second largest assessment unit in the country. (I should add that Dale Carlson, the head of CAP, is now putting a major effort into rectifying this problem.)

The Many Ways Teachers Mis-Assess Reasoning

If many teachers take bad reasoning to be good, do they also take good reasoning to be bad? Unfortunately the answer appears to be, "Yes." This became apparent in a Center for Critical Thinking research project in which teachers were provided with a well-reasoned response to the California prompt, in addition to the poorly reasoned one. The participants were teachers enrolled in critical thinking workshops. They were given the two essays to assess after receiving a morning's instruction on critical thinking. What is significant is the myriad of confusions and misunderstandings about the assessment of reasoning that emerged and the inconsistencies in both grading and in justifying grades.

Here is the "well-reasoned response" they were asked to assess alongside the poorly-reasoned "Rock Around the Clock."

This second essay (next page) was written by one of the research staff members of the Center who made sure that it was responsive to the directions and displayed all of the critical thinking abilities called for:

- 1) it distinguished mere subjective preference from well-reasoned assessment,
- 2) it was responsive to the logic of the question at issue,
- 3) it formulated and discussed alternative relevant criteria,

- 4) it distinguished having evidence relevant to a question from lacking such evidence,
- 5) it displayed intellectual humility,
- 6) it displayed intellectual integrity,
- 7) it drew only those conclusions the evidence warranted.

The results highlighted the problem. On one occasion 81 teachers and administrators assessed the two essays. The poorly-reasoned essay was given an average score of 5.4 (out of 8) while the well-reasoned essay was given an average score of 3.9. Forty-nine of the teachers gave the poorly-reasoned essay a 6, 7, or 8, while only 18 teachers gave the well-reasoned essay a 6, 7, or 8.

Can I Prove Rock Music is Better?

It's certainly hard to objectively judge music based on justifiable criteria because most people don't have any real standards for the music they listen to other than they like it. My friends and I are probably no different from other people. We listen to music we like because we like it. But this assignment asks me to give good reasons why we like what we like. I'm not sure I can, but I'll try.

I first wonder what would be a really good reason for liking any kind of music (other than it sounds good to you). Well, I suppose that one possible good reason for preferring one kind of music to another is that it expresses better the problems we face and what we can do to solve those problems.

Does this give me a good reason for preferring rock music to other kinds? Perhaps so. Certainly, rock music is often about problems that we have: problems of love and sex, school and parents, drugs and drink. I'm not sure, however, whether the "answers" in the songs actually are really good answers or just answers that appeal to us. They might even increase our prejudices about parents, teachers, school, and love. I'm not sure.

Another possible good reason for preferring one kind of music to another is that it is written better or more skillfully performed. Can I truthfully say that rock music is more skillfully written or performed than other kinds of music? In all honesty I cannot.

So what is my conclusion? It is this. I am unable to give any objective reason for liking rock music. My friends and I are like most people. We like the music we listen to just because we like it. For better or for worse, that's all the reason we have. What do you think? Can 15 million teenagers be wrong?

Even more illuminating than the raw scores were the reasons given by the teachers and administrators. Multiple confusions surfaced, as I suggested above, about the nature of reasoning and the appropriate way to assess it. Let's look at some of the responses. Try to imagine students actually receiving these grades along with the often mistaken, confused, or unintelligible commentary.

I have divided teacher assessments for convenience into two groups. The first consists of those teachers who grade the poorly reasoned essay higher than the well-reasoned essay. The second consists of those teachers who grade the poorly reasoned essay lower than the well-reasoned essay. Reading the teachers' justifications for their grades reveals a great deal of misunderstanding of the nature of reasoning. [First Essay: "Rock Around the Clock" (the poorly reasoned essay) Second Essay: "Can I Prove Rock Music is Better?" (the well-reasoned essay)]

First Group of Teachers

The following teachers give a high grade to the poorly reasoned essay and a low grade to the well-reasoned essay. In virtually every case, the teachers reveal no awareness of the importance of intellectual humility, wherein one does not claim to justify a conclusion when one lacks the evidence to do so, instead, one gives good reasons for suspending judgment.

- 1) A Physical Education Teacher: [#1] "The first essay better fulfills the criteria for the assignment because the writer justifies (his or her) preference for a particular type of music. I think I would give it a 7 though because it was kind of confusing how the writer got on the subject.
 - [#2] "The second essay did not justify a preference for any particular type of music. So the writer did not meet the criteria for the assignment. Strangely enough it was easier to read but possibly because the way the writer feels is how I feel about music in general. I think the essay deserves a '0'."
- 2) An English Teacher: [#1] "I would give this essay a 7 because he/she gave experience from his/her life to support their opinion gave reasons and evidence by example.
 - [#2] "I would give this essay a grade of 2 because he/she did not prove a point merely rambled from one thing to another searching for a reason."
- 3) A Math Teacher: [#1] "I would give the first essay a 5 because it did not support the judgment well but did make many references.
 - [#2] "I would give the second essay a 3 because it is not very evaluative! It did analyze the subject but provided no real support of any judgment."
- 4) A Math Teacher: [#1] "I would give this paper a grade of 7 because criteria were evident, analysis was good and it had lots of supporting evidence.
 - [#2] "I would give this paper a 3 because criteria are given but nothing was analyzed and no supporting evidence."
- 5) Freshman Studies Teacher: [#1] "I would give 'Rock Around the Clock' a grade of 6 because: a) a more flowing style of writing than a series of loosely related points, b) a personal approach, c) specific information as to records and effects of the songs, d) valid and accurate comparisons, e) personalization, f) availability, g) a well-supported point of view, and h) R&R as an avoidance tool.
 - [#2] "I would give 'Can I Prove Rock Music is Better?' a 3 because
 - a) statement of problem OK, b) no exploration about 'Why we like it',
 - c) discusses what it is about, not why we listen. Do we listen to the words or music?, d) the idea of 'better performances' not followed through on, and e) How do they know they are like 'most people'?"
- 6) A Math Teacher: [#1] "The first essay: grade 6. The writer has set up some criteria for his choice, the music gives him a calming influence.... Since the writer is given the opportunity to set his own criteria, this will suffice. He gives examples to justify his conclusions.
 - [#2] "The second essay: grade 3. An attempt is made to give reasons for supporting the music but no conclusions are made. The writer cannot make an argument for his case in any area. It is difficult, as the writer has said, to justify choice or preference, but since one can choose one's own criteria it would seem any position well-argued and justified would fulfill the assignment. The author did not succeed in doing that."
- 7) Subject Taught Not Identified: [#1] "Rock Around the Clock' Score: 6. This student does not give any clear criteria to start off as to possible criteria to base their evaluation on. This student based their evaluation on how it made them feel or respond. It was based on reactions not facts to choose music by, but at least this student used something to justify their preference.
 - [#2] "'Can I Prove Rock Music Is Better?' Score: 2 Too vague never really makes a decision about their preference of music. This student talks about possible criteria but never really says anything about it. Shows no support to justify the preference."

- 8) Former English Teacher: [#1] "I would give this essay a grade of 8 because: a) essay cites specific examples, b) catchy opening, c) the criteria used was based on student's personal experience, d) student was asked to justify their preference. I think she did.
 - [#2] "I would give this essay a grade of 2 because: a) very generalized, b) few, if any, concrete examples, c) essay is not personalized to any extent, d) no specific conclusions drawn."
- 9) Special Ed. Teacher: [#1] "Point total: 7. This essay listed three criteria on which to base a judgment. It gave examples of each maybe better examples could be found. The writer attempted to analyze a basically subjective issue in concrete terms what the songs do for them: not objective, but a fairly concrete assessment of music's subjectivity.
 - [#2] "Point total: 0. This essay did not seriously attempt to answer the issue at hand. Instead it concluded, quite lamely, that no objective statement of worth could be made. While this may be accurate in the broadest sense, no effort was made to justify that position."
- 10) English Teacher: [#1] "I would give this essay a 7 because the author is not afraid to take a stand. Although the 'proof' is emotionally based, that was the direction of his/her argument.
 - [#2] "I would give this essay a 3 because the writer was not able to take a position. He/she beats around the bush and asks the reader to make the decision when that was the assignment to the writer. The insecurity and negative attitude runs through the entire paper."

Second Group of Teachers

The following teachers give a low grade to the poorly reasoned essay and a high or higher grade to the well-reasoned essay. In some cases the teachers revealed some awareness of the importance of intellectual humility. Some are, however, confused or mistaken in part about reasoning and its assessment. For most, thankfully, this confusion is conjoined with some insight into reasoning. For some few others, the fact that they graded the poorly-reasoned essay lower is not based on insight but chance. This is apparent from some of the reasons they give.

- 1) A Library-Media Teacher: [#1] "Grade: 3 or 4. Reasons: My first thought that it wasn't a typical essay but rather starts out with a rather clever, attention-getting device. In that sense, the student did catch my attention and also confused me somewhat. That is, it doesn't start out as a typical essay. The student is a good writer in that their word choices make sense and there are supporting reasons for why they chose rock music and pop music.... Now that I read this again, I can see that really the writer has only supplied one reason for their selection: the control/expression of feelings. Well, it's the same old problem in grading a paper, i.e., the student writes well but hasn't followed the criteria strictly.
 - [#2] "Grade: 7. Reasons: Just a first critical response before I re-read it. It strikes me as thoughtful and honest (which always impresses me). Now I'll see how it fits the criteria. The writer states he needs good reasons for his judgment. I don't think that 'good' is the word he wants.... Why do we like what we like? That's a provocative question!... A quickie, yes, I think they've fulfilled most of the criteria, just not in the usual fashion. Also, it's an essay (as I define one)."

- 2) A Special Ed. Teacher: [#1] "The student in this essay never really makes a statement that involves an evaluation of a judgment made concerning a type of music, except to say 'My favorite type of music is rock and pop rock. Without them there is no way I could survive mentally.' He does try to show what he means by this statement when he offers examples of music that affect his mood. He lacks a clear evaluation or supportive evidence toward the topic. I think his statement about surviving mentally is a bit much. I give it a 4.
 - [#2] "This student doesn't know what he thinks and he lets you know it continually. His closing paragraph summarizes what he is trying to put down in the essay and it is the most straightforward part of the essay. His title doesn't quite jibe with the rest of the essay. He was supposed to prove rock music is better, but what he really talked about was whether there was any justification for why people like rock music. I give it a 5."
- 3) A Social Studies Teacher: [#1] "I would give essay one a grade of 6. Essay number one lists reasons for liking rock music, but it is very superficial in analyzing them in the light of the criteria. It really does not approach the subject in a way that logically lists possible criteria as a basis for analysis and then applies the criteria to the music. The essay is generally Bull Shit with only a general connection to the instructions.
 - [#2] "I would give essay #2 an 8 because the possible criteria for analyzing the issue are covered...."
- 4) An English Teacher: [#1] "Score: 3. The writer in essay one has discussed how he/she feels about rock and pop music, but generalities are given and his/her statements aren't supported with evidence. The assignment is to 'justify' preference, not discuss that it makes him/her 'feel good' period. No criteria have been established, so the essay just rambles on about 'feelings' and not much else. Reasons and evidence are lacking.
 - [#2] "Score: 5. This essay does a little bit better in attempting an argument. The essay establishes two 'criteria' on which to base his/her essay.... Examples of 'answers' in paragraph 3 are needed as evidence.... Paragraph 4 isn't developed. Needs reasons and evidence/ examples. Weak Conclusion."
- 5) A Physical Education Teacher: [#1] "I would grade the essay 0. The essay does not show their judgment about worth with reason and evidence as asked in the directions. There are no criteria for evaluation, analysis with criteria or evidence that clearly supports the judgments.
 - [#2] "I would grade the essay 5. The essay attempts to set up criteria for evaluation, yet not as completely as it could have been done. There was an attempt to analyze the subject with the criteria, but not complete. There was no evidence to clearly support the judgment."
- 6) A Second Grade Teacher: [#1] "The first essay should have a 3 because the stated criterion is subjective. The conclusion comes down to, 'I like it because I like it.'
 - [#2] "The second essay would have a 6 because there was a search for good criteria and no evidence was found to support the good criteria."
- 7) A Counselor: [#1] "I would give this essay a 1 because the student did select a topic to evaluate which fit the directions. However, she reported her subjective taste (how some songs have affected her, which songs she likes) rather than evaluating 'rock music'.
 - [#2] "I would give this essay a 7 because: a) she selects an appropriate topic, 2) she considered what criteria would be appropriate to evaluate rock music, c) she made judgments based on the criteria she listed, 4) her conclusion was based on her criteria/judgment. However, she might have considered/used other criteria."
- 8) A Sixth Grade Language Arts Teacher: [#1] "A grade of 1. There was no evaluation, went strictly by senses.
 - [#2] "A grade of 8. The writer did a good job on a subject that is a matter of preference no matter how you look at it! He tried to objectively judge rock music, but in the end... 'We like it just because we like it.""

9) A First Grade Teacher: [#1] "I would give 'Rock Around the Clock' a 4 because the writer did give some facts for liking rock music but wrote mostly from emotion without questioning if her facts were sound. For example, 'believe in my friends because they are my friends'.

[#2] "I would give 'Can I Prove Rock Music is Better?' a 7. The writer stated the purpose, criteria, facts, and gave a conclusion. The writer considered more than just feeling. More facts for liking rock music are needed."

♦ Introduction to the Analysis and Evaluation of Reasoning

There are two obstacles that stand in the way of fostering sound reasoning K–12: 1) teachers must learn how to devise assignments that require reasoning, and 2) teachers must learn how to analyze and evaluate reasoning objectively. This process will not happen overnight, but the sooner it begins, the sooner it can be achieved.

We will shortly take a look at three assignments that call for reasoning as well as at three examples of student work for each of those assignments: student work with no reasoning in it, student work with poor reasoning in it, and student work with good reasoning in it. In each case, we will provide a brief commentary to help make clear what one should look for in the reasoning. But first we will provide a brief overview of what is involved, in general, in the analysis and evaluation of reasoning.

What Is Involved in Analyzing and Evaluating Reasoning?

The fundamental criteria to use in analyzing and evaluating reasoning comes from an analysis of the purpose of the reasoner and the logic of the question or questions raised. For example, if a person raises the question, say, as to whether democracy is failing in the USA (in the light of the dwindling number of people who vote and the growing power of vested interest groups with significant money to expend on campaign contributions), we can establish general criteria for assessing the reasoning by spelling out what in general one would have to do to settle the question. Those criteria would include such matters as the following:

- 1) An Analysis of the Concept of the Ends of Democracy. What would it be for democracy to succeed? What would it be for it to fail? What do we take the fundamental objective of democracy to be? For democracy to succeed is it enough that it simply ensure the right of the people at large to vote or must it also serve the well being of the people as well?
- 2) Collection of the Facts About the Numbers of People Not Voting. What is the actual number of people not voting? Is it growing? By what percentage?
- 3) An Interpretation of the Significance of the Facts Collected in #2. What are the reasons why growing numbers of people are not voting? What are the implications of those facts?
- 4) Collection of Facts About the Number of Vested Interest Groups Influencing Elections. How many vested interested groups are influencing elections today in comparison to the past? What is the nature and extent of their influence in money spent?
- 5) An Interpretation of the Significance of the Facts Collected in #4. What is the significance of the growing influence of vested interest groups on election outcomes? What is gained and lost by means of that influence?
- 6) **Synthesis of Numbers 1 through 5**. What is the overall significance of what we have found out in 1 through 5? What does it all add up to? What exactly are we gaining and losing as a result of the growing influence of vested interest groups and diminished numbers of voters? In attempting to put everything together we would want to see reflection on this issue from more than one point of view. We would want to assess how the reasoner responds to reasonable objections from other points of view.

These are some of the considerations relevant to reasoning well about the issue. A rational analysis of someone's response to this issue would involve, then, checking to see if the above considerations were reasonably addressed, to see if the reasoner had done a plausible job in analyzing the functions of democracy, collecting relevant facts and information, interpreting those facts, and putting everything together, with a sensitivity to more than one point of view, into one coherent line of reasoning.

Many of the teachers assessing the reasoning of the essays on rock music above failed to analyze or review the logic of the question at issue. Instead they read the essays impressionistically, allowing the grade they gave to be determined more by whether their impressions were positive or negative than by any close analysis of the degree to which the student responded adequately to the demands inherent in the precise question at issue.

It is the logic of the question at issue which is the "system for thinking" that should guide our reasoning. If we do not develop skill in explicating that logic, our reasoning is apt to become impressionistic, guided by our prejudices and biases, by our egocentrism and ethnocentrism, rather than disciplined by rational considerations.

♦ Three Examples of Student Reasoning

What follows below are three assignments designed to call for reasoning on the part of the students, along with three examples of student "reasoning" in response to those assignments. Two of the assignments are in history and the other in literature. The three issues the students are asked to develop their reasoning on involve: reasoning about the character of the American people, reasoning about the meaning of a poem, and reasoning about the comparative importance of inventions. It would be useful if you thought a little about your own assessment of the students' reasoning before you looked at ours'. You could then compare the two.

American History: Reasoning About the American Character

Question at Issue: "Are the Americans you know capable of the kind of mass hysteria which occurred in 1919 and is described in a textbook as the 'Red Scare'?"

Directions: One of the most important reasons to write our history is to discover who we are and who we are not, how we can develop ourselves, what faults we have to watch out for, and what strengths we can build upon. Read the passage in your textbook on the "Red Scare." Then write a couple of paragraphs in which you try to figure out whether the Americans you know are "capable" or "not capable" of reacting as many Americans did in 1919. (See textbook, p. 731.) Be sure you show us your reasoning. Support and explain why you think as you do.

Reading Excerpt: The "Red Scare"

(from *America: Past and Present*, by Divine, Breen, Fredrickson, and Williams; Scott, Foreman and Company, 1984, p. 731.)

The first and most intense outbreak of national alarm came in 1919. The heightened nationalism of World War I, aimed at achieving unity at the expense of ethnic diversity, found a new target in bolshevism. The Russian Revolution and the triumph of Marxism frightened many Americans. A growing turn into communism among American radicals (especially the foreign-born) accelerated the fears, although the numbers involved were tiny — at most there were sixty thousand Communists in the United States in 1919. But they were located in the cities, and their influence appeared to be magnified with the outbreak of widespread labor unrest.

A general strike in Seattle, a police strike in Boston, and a violent strike in the iron and steel industry thoroughly alarmed the American people in the spring and summer of 1919. A series of bombings led to panic. First the mayor of strike-bound Seattle received a small brown package containing a homemade bomb; then an alert New York postal employee detected sixteen bombs addressed to a variety of famous citizens (including John D. Rockefeller); and finally, on June 2, a bomb shattered the front of Attorney General A. Mitchell Palmer's home. Although the man who delivered it was blown to pieces, authorities quickly identified him as an Italian anarchist from Philadelphia.

In the ensuing public outcry, Attorney General Palmer led the attack on the alien threat. A Quaker and progressive, Palmer abandoned his earlier liberalism to launch a massive roundup of foreign-born radicals. In a series of raids that began on November 7, federal agents seized suspected anarchists and Communists and held them for deportation with no regard for due process of law. In December, 249 aliens — including such well-known radical leaders as Emma Goldman and Alexander Berkman — were sent to Russia aboard the *Buford*, dubbed the "Soviet Ark" by the press. Nearly all were innocent of the charges against them. A month later, Palmer rounded up nearly four thousand suspected Communists in a single evening. Federal agents broke into homes, meeting halls, and union offices without search warrants. Many native-born Americans were caught in the dragnet and spent several days in jail before being released; aliens rounded up were deported without hearings or trials.

For a time, it seemed that this Red Scare reflected the prevailing views of the American people. Instead of condemning their government's actions, citizens voiced their approval and even urged more drastic steps. One patriot said his solution to the alien problem was simple: "S.O.S. — ship or shoot." General Leonard Wood, the army chief of staff, favored placing Bolsheviks on "ships of stone with sails of lead," while evangelist Billy Sunday preferred to take "these ornery, wild-eyed Socialists" and "stand them up before a firing squad and save space on our ships." Inflamed by public statements like these, a group of legionnaires in Centralia, Washington, dragged a radical from the town jail, castrated him, and hanged him from a railway bridge. The coroner's report blandly stated that the victim "jumped off with a rope around his neck and then shot himself full of holes."

The very extremism of the Red Scare led to its rapid demise. Courageous government officials in the Department of Labor insisted on due process and full hearing before anyone else was deported. Prominent public leaders began to speak out against the acts of terror. Charles Evans Hughes, the defeated GOP candidate in 1916, offered to defend six Socialists expelled from the New York legislature; Ohio Senator Warren G. Harding, the embodiment of middle-class values, expressed his opinion that "too much has been said about bolshevism in America." Finally, Palmer himself, with evident presidential ambition, went too far. In April 1920, he warned of a vast revolution to occur on May 1; the entire New York City police force, some eleven thousand strong, was placed on duty. When no bombings or violence took place on May Day, the public began to react against Palmer's hysteria. Despite a violent explosion on Wall Street in September that killed thirty-three people, the Red Scare died out by the end of 1920. Palmer passed into obscurity, the tiny Communist party became torn with factionalism, and the American people tried hard to forget their momentary loss of balance.

Student #1

The people I know are not like the people who lived in 1919. They obey the law and, though they might make some mistakes or do some things they ought not to, they would never hurt someone who was innocent. Most of the people I know go to church and believe in God. They

are good Christians. They read the Bible. They try to raise their children to be good and avoid evil. They are kind people. So I don't believe that what happened in 1919 could ever happen again. It won't happen in my neighborhood.

Commentary on the Student's Reasoning

There is very little reasoning in this student's work and, on the whole, what there is seems uncritical and self-serving: in essence, "My friends are good. Therefore they wouldn't do anything bad." There are obvious objections to this reasoning. Presumably, most of the people in 1919 also went to church and believed in God. Presumably, they too would have thought themselves to be good Christians. Presumably, their friends thought of them as kind and as trying to raise their children to be good and to avoid evil. As a result, the student has not really responded to the logic of the question which implicitly requires that we think about mass hysteria, how it occurs, and how it influences otherwise morally sensitive people to behave in a morally insensitive way.

Student #2

Certainly there are always people who go overboard. That is human nature. And it is unreasonable to think that we will ever abandon human nature. The American people rightly recognized the threat that communism posed to our way of life and fought against it. After all, if we had defeated it then we would not have to have fought the Cold War and spent so much money and resources to defeat the communists after WW II. So what is the lesson. Watch out for human nature. Don't go overboard. But on the other hand, don't forget who your enemies are and don't give up the fight against them just because some people punish them too severely or go to an extreme.

Commentary on the Student's Reasoning

There is more reasoning in this student's work, but still not very good reasoning: in essence, "It is human nature for some people to lose control. So (by implication) some of us might do so, but whether or not some of us might act as some people in 1919 did, the people in 1919 were right to fight against communists." This reasoning is weak because it largely ignores the issue raised. The question at issue is not whether it was right for the people in 1919 to oppose communism, such as it was, in the USA at the time. The question is rather how it came to pass that, as we expressed above, otherwise morally sensitive people came to behave in a morally insensitive way. The student didn't take this question seriously.

Student #3

It is hard to answer the question as to what anyone is capable of. Perhaps what we are capable of is largely a result of the circumstances we are under. If we assume that all humans share human nature and that because of human nature we are capable of acting out of intense fear or insecurity or hate, then a lot depends upon whether something or someone is able to stir those things up in us. Perhaps, of course, there is a way to raise people so that they have so much good character that even when someone tries to stir up the "worst" in them, they do not give in, they resist the temptation to let their worst side take control of them. The question could then be asked whether I and my friends and neighbors are in the first or the second group. Since we have never been "tested" in a crisis situation, since we have never felt deeply threatened, I don't think I can honesty say we would pass the test. I don't know whether we would act like a "Charles Evans Hughes" or a "Billy Sunday." It's a scary thought.

Commentary on the Student's Reasoning

This is better reasoning than in either of the two passages above: in essence, "Everyone has a worse and a better side. Everyone's worse side can be appealed to. Whether you have the "character" to withstand an appeal to your worse cannot be known until you are "tested." My friends and I have not been tested. Therefore, we cannot know whether we have the character to withstand such an appeal. Therefore, we don't know whether we would or would not act as many did in 1919."

English: Interpreting Poems

Question At Issue: What is John Donne saying in his poem "Death Be Not Proud"?

Directions: Carefully read the poem below, trying to figure out what the poet is saying. Be careful to explain what your interpretation is and what exactly it is based on. Show us your reasoning. Make sure your interpretation is consistent with (all of) what the poem says.

Death Be Not Proud
(John Donne 1572–1631)

Death be not proud, though some have called thee
Mighty and dreadful, for, thou art not soe,
For, those, whom thou think'st, thou dost overthrow,
Die not, poore death, nor yet canst thou kill mee.
Much pleasure, then from thee, much more must flow,
And soonest our best men with thee doe goe,
Rest of their bones, and soules deliverie.
Thou art slave to Fate, Chance, kings, and desperate men,
And dost with poyson, warre, and sicknesse dwell,
And poppie, or charmes can make us sleepe as well,
And better then thy stroake; why swell'st thou then?
One short sleepe past, wee wake eternally,
And death shall be no more; death, thou shalt die.

Student #1

I don't like this poem. It is boring and confusing. The guy does not spell correctly. He talks a lot about death but he does not say anything. I don't see why he thinks death is mighty or why he thinks it can't kill him. He says a lot of confusing things. At one time he says it gives pleasure and then talks about bones resting, which makes no sense. Then he talks about flowers and sleeping. Finally he says that death shall be no more and that it shall die. I don't get it. Why doesn't he just say what he wants to say? This is a terrible poem. Why do we have to read such stupid stuff?

Commentary on the Student's Reasoning

This student provides us with virtually no reasoning at all. Rather than attempt to figure out what the poet is saying by closely reading what is said, the student rejects the poem, dismisses it emotionally. The result is that the student flagrantly mis-reads the poem and blames his mis-reading on the poem itself and the poet. The student needs to be introduced to the concept of critical reading in which the reader uses the text as evidence to use in interpreting the meaning.

Student #2

Mr. Donne says that death should not be proud. It is not mighty or dreadful. He says this because death is like sleep and when you go to sleep you rest. Therefore, because it is restful even the best people sleep, even slaves. And sleeping is better than being poisoned or being sick. Finally, he says that we only sleep a while and then we awake. And then death is gone. In fact, it is dead. He thinks this is good.

Commentary on the Student's Reasoning

There is more reasoning in this student's work but most of it ignores the evidence of what the poem says. The poem does not say or imply, for example, that "because it [death] is restful even the best people sleep, even slaves." The poem does not say or imply that "sleeping is better than being poisoned or being sick." Finally, it is clear that the student is not getting the major point of the poem, namely, that because of the promised resurrection, last judgment, and eternal life in heaven or hell, there is a sense in which "death" is

not real and lasting, but only something that will "die." Like the first student, this student also needs to be introduced to the concept of critical reading in which the reader uses the text as evidence in interpreting meaning.

Student #3

It is clear that Donne believes in God or at least in an afterlife. This is implied in the first four lines which I interpret as saying something like this: "Don't think you're so powerful because no one really dies but only appears to die" (People who "die" are really just awaiting their resurrection). This interpretation is supported in the next line which implies that what we call death is really a kind of "sleepe" and is not, therefore, very bad. In fact, as he says sleep often gives us "pleasure." The next lines make a different kind of point but still are a criticism of the view that death is "mighty" and "dreadful." Death, he says, is not able to control "Fate, Chance, kings, and desperate men." Furthermore, not only is it not able to control these other forces, it can't even get away from such unpleasant associates as "poyson, warre, and sicknesse." Finally, he reasons, narcotics makes us sleep as well as death does and when everyone is resurrected for final judgment (which I infer is what he means) then death itself will be gone forever, and therefore "shalt die."

Commentary on the Student's Reasoning

Finally, we have a student who illustrates the process of critical reading, carefully reasoning her way through the poem, using the words of the poem to carefully back up her interpretation.

History: Reasoning About the Significance of Inventions

Question at Issue: "Of two inventions discussed in your textbook, which was the most important and why?"

Directions: The textbook for the course describes a number of important inventions, including those of Gutenberg, Edison, and George Washington Carver. Take two inventions, either from those mentioned in the book or some other inventions you know of, and compare their importance. Defend your answer by giving reasons in favor of your judgment.

Student #1

An invention that is very important is the printing press. It was invented by Johann Gutenberg, who was a man that lived in Germany. He invented the printing press in the Fifteenth Century. The first book ever printed by Gutenberg was the Bible. But he soon printed many other books as well. The first printing press worked by using movable type.

Another important invention mentioned in the textbook was the dehydration of foods. This was invented by George Washington Carver. When you dehydrate foods you take the water out of them. George Washington Carver wanted many people to use his inventions, so he did not take out any patents on them. He made many other inventions besides dehydration. He even thought of more than 300 uses for the peanut, including facial cream, shoe polish, and ice cream

Both inventions are very important. Many people read books that are printed on a printing press. Many people eat food that has been dehydrated. But to me the printing press was more important than dehydration.

Commentary on the Student's Reasoning

The student does not provide any reasoning to support his conclusion. He discusses no criteria for assessing inventions for their importance, nor any evidence to support one or the other with respect to those criteria. Most of the factual detail is irrelevant to the issue.

Student #2

R-r-r-ring.

The first sound I hear in the morning is my alarm clock going off. It's an invention I truly hate.

R-r-r-ring.

It is not a pretty sound, and as soon as I hear it I feel myself getting angry. If only I didn't have to get up so early! All my muscles cry out that I want to sleep! Most mornings when I hear that sound, I even cover my ears with my pillow in the hope that I won't hear it going off.

It is an old-fashioned wind-up alarm clock that loses ten minutes a day. It is not a digital alarm clock because all the digital alarm clocks I've ever tried have alarms that are too soft to awaken a really sound sleeper. And believe me I am a very sound sleeper.

R-r-r-ring. But no matter what I do, or how I feel, I end up wide awake and out of bed and getting dressed for school.

Once I am awake I look at my other clock, the one that is hanging on the wall over my dresser. It is a great invention too. It's a digital clock that keeps perfect time. It has a red LED display and it glows in the dark. It has an emergency battery backup, so that even if the electricity cuts out in the night, my wall clock never loses a second.

Which of the two inventions is more important? That's the question I ask myself as I head off for school. And then the answer comes to me. No matter how perfectly the digital wall clock keeps time, without the alarm clock I wouldn't be awake to see it. So without doubt the alarm clock wins the prize as most important.

Commentary on the Student's Reasoning

The student provides some reasoning but when considered closely it is apparent that the reasoning is absurd. The notion that without the alarm clock people would never wake up is ridiculous. What does this student think happened before the alarm clock was invented? Furthermore, does she really think that loud alarms cannot be built into digital clocks? Once again, the student has not learned to think about the logic of the question at issue. Therefore, the student gives no time to reflecting on the general criteria by means of which we might assess the social worth of inventions by relating that worth to the most basic human values, like the preservation of life, the minimization of pain and suffering, the development of a more just society, and so forth. It is only in terms of the concepts of basic human values that criteria can be generated that give a solid logic to the question and hence a means to assess the reasoning which purports to settle the question.

Student #3

Two inventions mentioned in the book are television and the dehydration of food. Each is important in different ways. The television set, for example, affects many people's lives. I watch television almost every night and so do all of my friends. But it's not just me and my friends. The same is true for people all across the country, and in most foreign countries as well. Television allows more people to be entertained than was ever possible before. We witness world news, nature programs, comedies and many other programs. Television lets us see much of what is going on in the world.

Dehydration of foods is important in a very different way. The main effects of dehydration are that it allows food to be kept for a long time without spoiling, and to be shipped for a lower cost. I don't know how many people in the world today use dehydrated foods, but I'm pretty sure that it's far smaller than the number of people who enjoy TV. So that seems to show that TV is more important.

And yet I don't feel right saying that one invention is more important than another simply because it has affected more people. If dehydration is used more than it is now, it could help cut down on the number of people who are starving in the world. Saving just a few people from dying of starvation is more important than taking a lot of people and entertaining them.

Commentary on the Student's Reasoning

The student provides some reasoning which might at first appear absurd, but on reflection makes good sense. This student is thinking about the logic of the question at issue and hence is reflecting on the general criteria by means of which we might assess the social worth of inventions by relating that worth to the most basic human values: like the quality or preservation of life, the minimization of pain and suffering, the devel-

opment of a more just society, and so forth. To say that this student's reasoning is better than the first two students — because she does respond to the logic of the question at issue — does not mean that her reasoning is perfect, for perhaps there are yet further considerations that might be mentioned about the effects of television which might persuade us that television itself is making so large a contribution to the quality or preservation of human life that it is indeed more important than food dehydration. We may know the basic logic of a question without knowing whether we yet have the best answer to that question, the answer that best fulfills its logic.

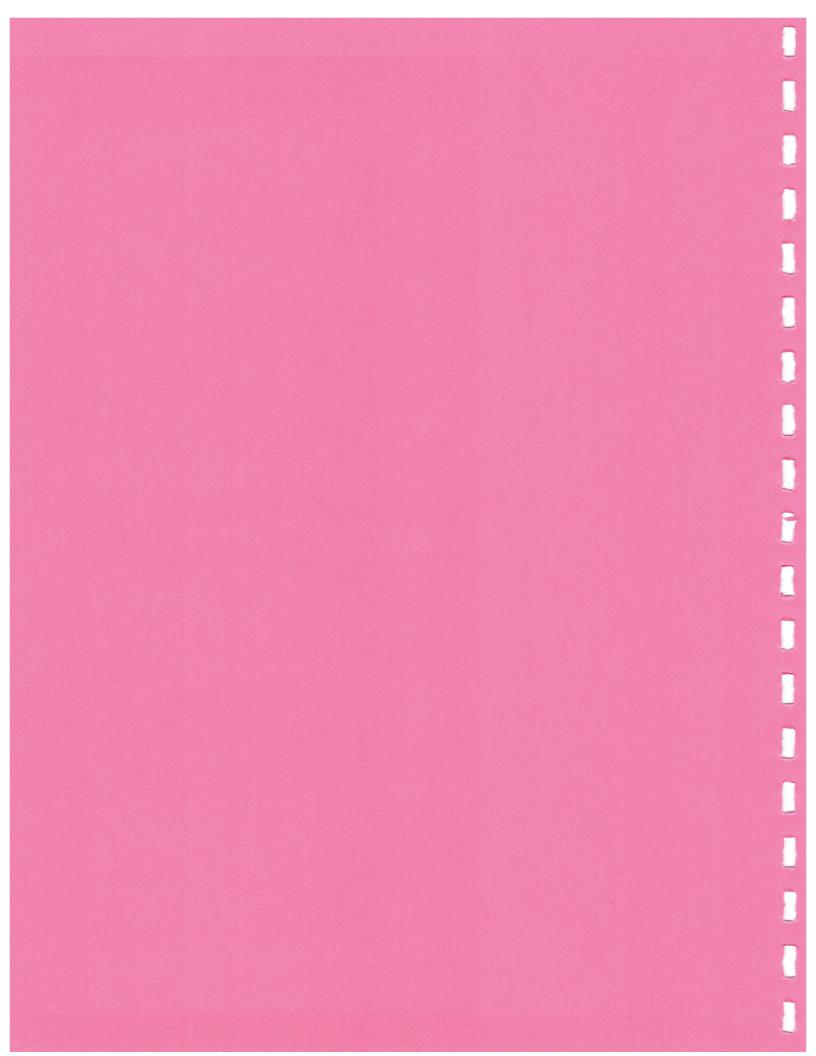
♦ Conclusion

The whole of this book is concerned with the process of developing students who reason through what they are learning so as to grasp the logic of it, students who know clearly the difference between coming to terms with the logic of something and merely rotely memorizing it. But reasoning is not a matter to be learned once and for all. It is a matter of life-long learning, a matter of bringing insightful mindfulness into the fabric of our thinking and our action. For the teacher, it is a matter of learning how to design instruction so that students take command of the logic of their own thinking while they are thinking and through that insightful grasp, improve it.

We figure things out better if we can monitor what we are doing, intellectually, in trying to figure them out, so that we go beyond simply using logical structures, so that we go beyond simply making logical moves, so that we start to intentionally, deliberately, and willfully examine and take apart the logical structures we are using, so that we designedly, purposively, and alertly assess our use of the structures in everyday situations, and, of course, so that we do these things well: clearly, accurately, precisely, etc.

To understand logical structures is to integrate them, to establish logical connections between them, to make it possible for the mind to make an extended series of nuanced inferences, deductions, and derivations. "This is so, therefore that also is so, and that, and that." The logical structures implicit in an educated person's mind are highly systematized. The well-educated person is able to reason quite directly and deliberately, to begin somewhere, know where one is beginning, and then reason with awareness from that point to other points, all with a given question in mind, with specific evidence in mind, with specific reasons to advance, with specific conclusions to support, with consciousness of one's point of view and of contrasting points of view. The good reasoner is always reasoning within a system that disciplines and restrains that reasoning.

When the logical structures by which a mind figures out the world are confused, a jumble, a hodgepodge, a mere conglomeration, then that figuring out is radically defective, typically in any of a variety of ways: incomplete, inaccurate, distorted, muddled, inexact, superficial, rigid, inconsistent, and unproductive. Then the mind begins it knows not where, takes things for granted without analysis or questioning, leaps to conclusions without sufficient evidence to back them up, meanders without a consciousness of its point of view or of alternative points of view. Then the mind wanders into its own prejudices and biases, its own egocentricity and sociocentricity. Then the mind is not able to discipline itself by a close analysis of the question at issue and ignores the demands that the logic of that question puts on it and us as rational, logic-creating, logic-using animals.



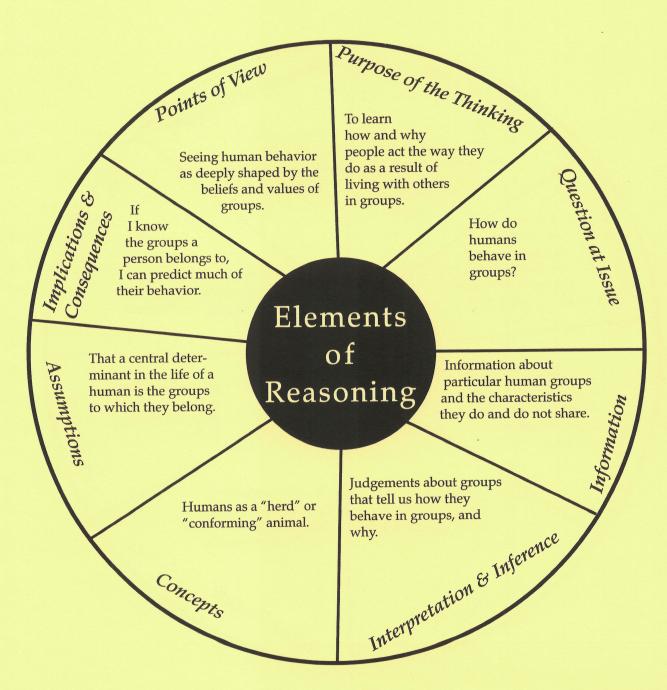
Appendix A

Sample Analyses of the Logic of...

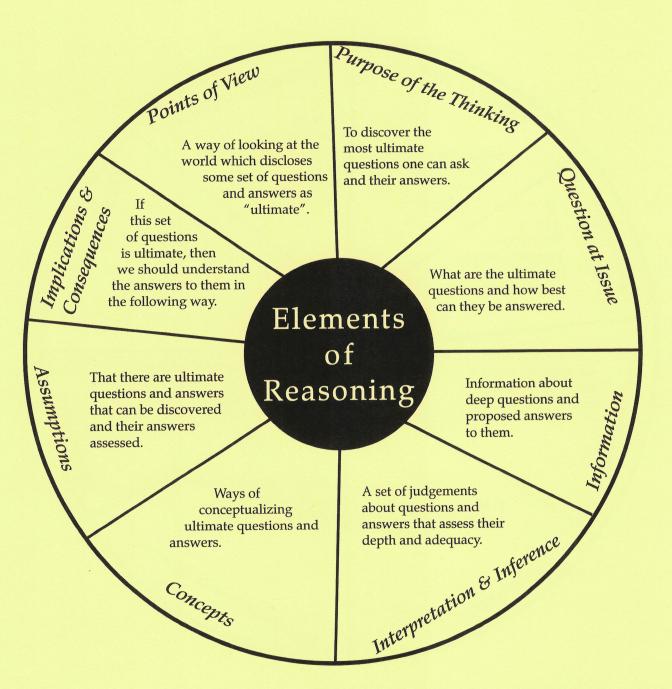
Examples of "The Logic of..."

- the logic of disruptive behavior
- the logic of student behavior (in general)
- the logic of "gang" behavior
- the logic of family relationships
- the logic of male/female relationships
- the logic of your relationship to your mate
- the logic of the male ego
- the logic of the female ego
- the logic of domination
- the logic of submissiveness
- the logic of manipulation
- the logic of romantic relationships
- the logic of "reading"
- the logic of "writing"
- the logic of "speaking"
- the logic of "listening"
- the logic of economics (economic logic)
- the logic of self-delusion
- the logic of money in politics
- the logic of "wellness"

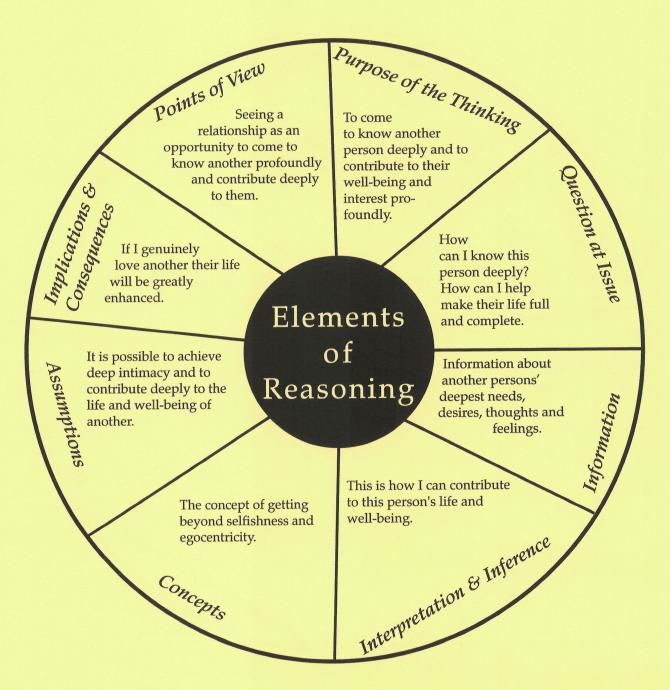
The Logic of Sociology



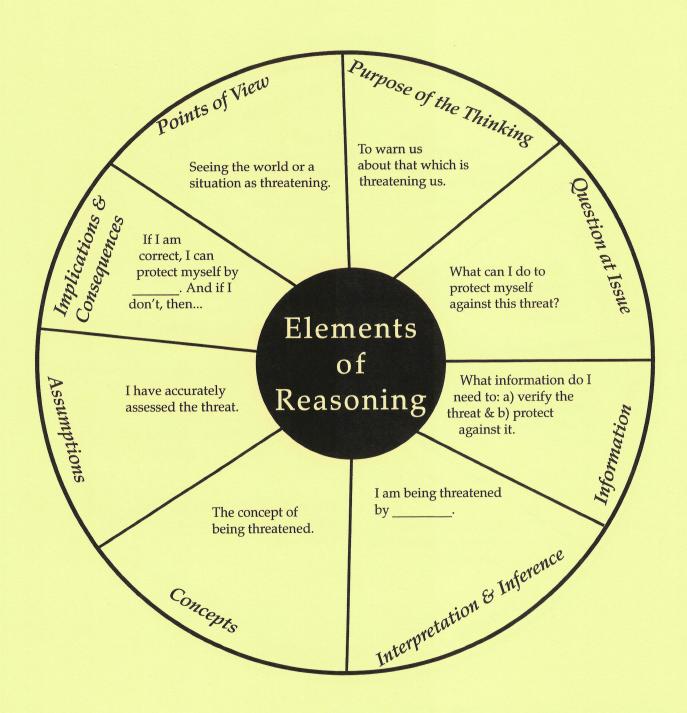
The Logic of Philosophy



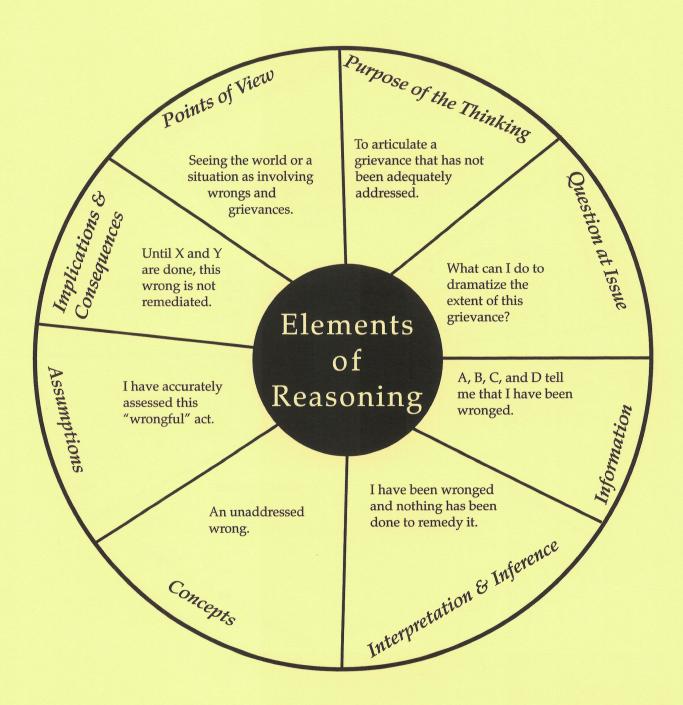
The Logic of Love



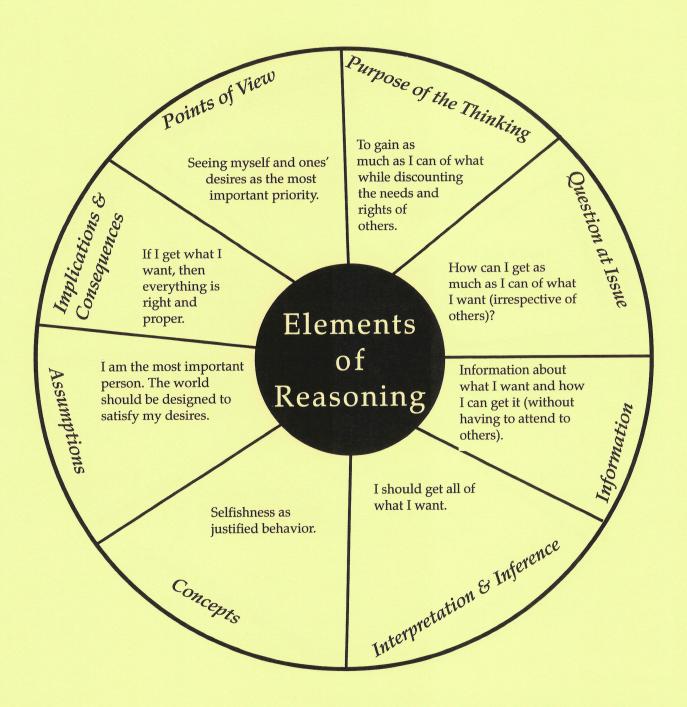
The Logic of Fear



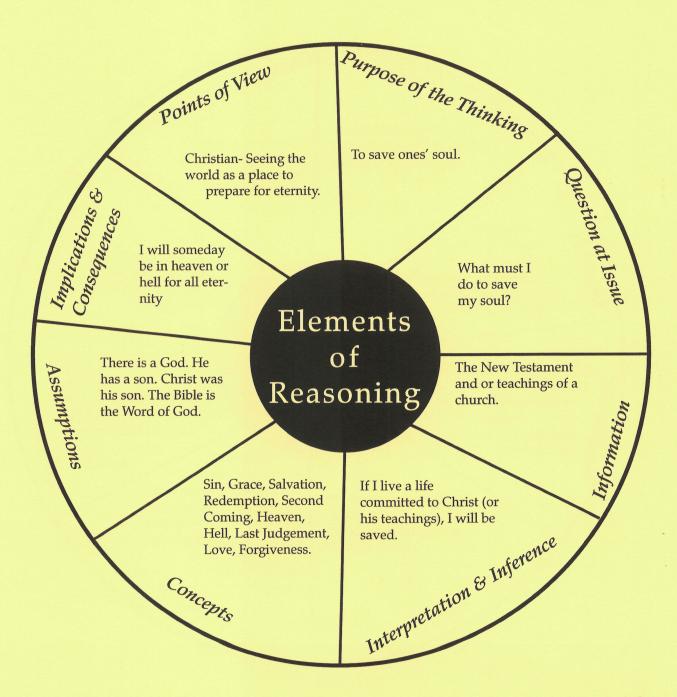
The Logic of Anger



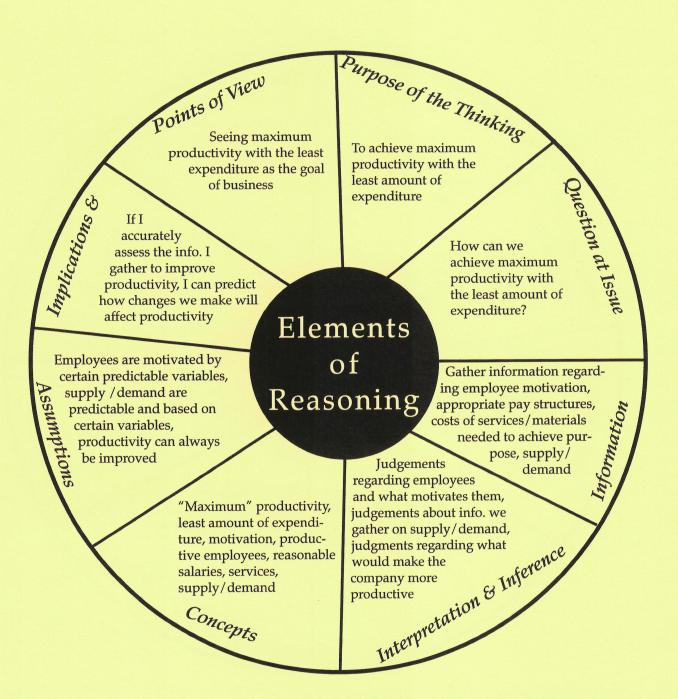
The Logic of Selfishness



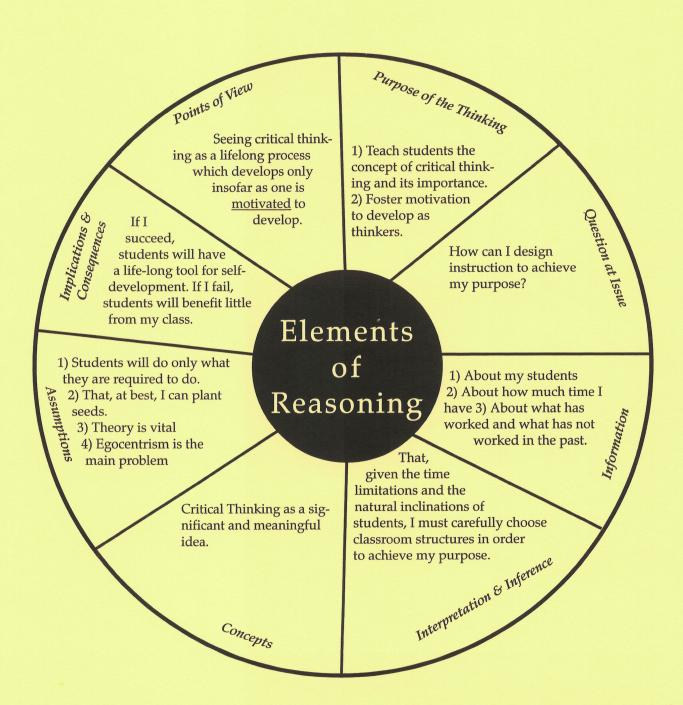
The Logic of Christianity

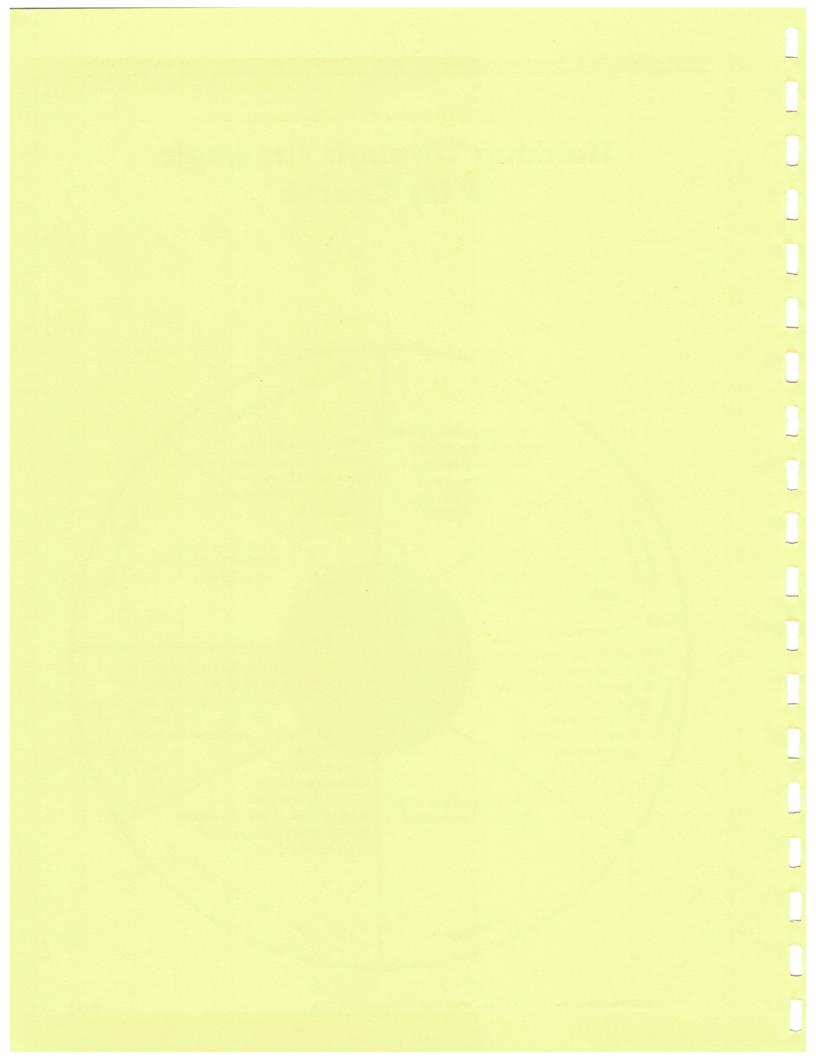


The Logic of Business



Thinking Through The Logic of My Course

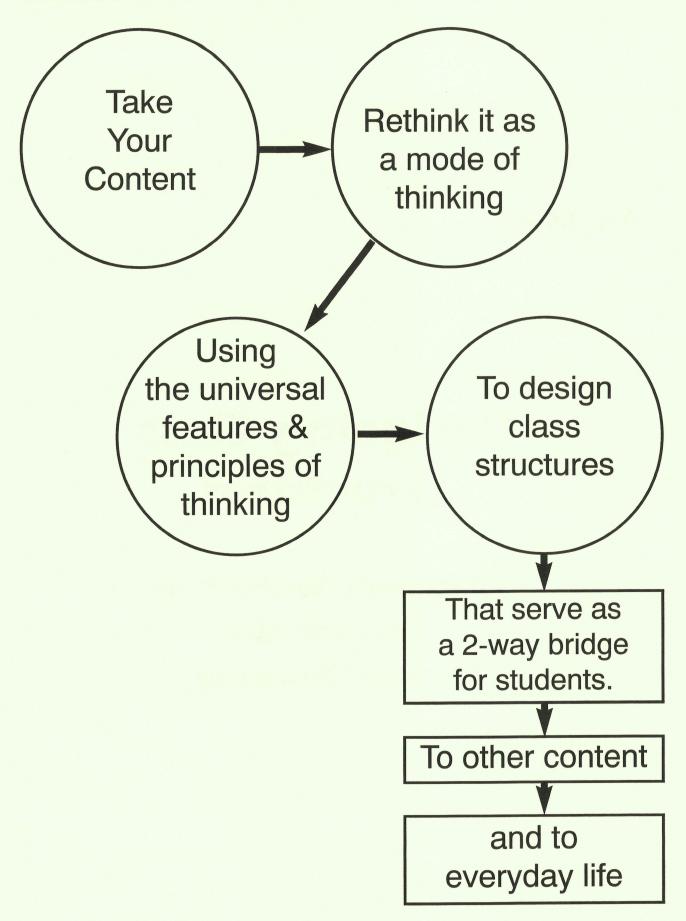




Appendix B

Designing Class Structures

(Based on Re-thinking Content as a Mode of Thinking)



Creative Thinking

Creative thinking
occurs when we produce
something novel which is
useful to us. It is often confused
with simply "novel" or "bizarre"
thinking. In the most precise
sense, however, when we say
that thinking is creative we are
praising it for its excellence,
not simply its
novelty.

There is a natural marriage between "creativity" and "criticality". Whenever our thinking excels, it excels because we succeed in designing or engendering, fashioning or originating, creating or producing results and outcomes appropriate to our ends in thinking. It has, in a word, a creative dimension. But to achieve any challenging end, we must also have criteria: gauges, measures, models, principles, standards, or tests to use in judging whether we are achieving that end.

As a result, when we give students tasks that require reasoning, there will inevitably be both some level of "creativity" and some level of "criticality" required. The generativeness of thinking and its judiciousness can only be artificially separated.

There are many ways to assign classroom activities that accentuate the "creative" side of thinking.

Here are a few examples: In history classes, students can be assigned tasks which call on them to actually "write" some history passages.

In math classes, students can be asked to generate as well as solve problems generated for them.

In English classes, students can be asked to generate their own criteria for doing a particular paper. That is, you assign the paper, the students figure out the appropriate criteria for assessing it (under your direction of course)

In science classes, students can be asked to devise and design their own experiment to verify or test some scientific principle.



Ethical Thinking

Ethical Thinking occurs when we reasonably apply one or more moral concepts or principles to everyday events

Moral Concept: Cruelty

Moral Principle: "No one is justified in inflecting needless suffering on any innocent person or creature"

Moral Concept: Justice

Moral Principle: "Everyone has a moral obligation to treat all persons fairly" (that is, to appropriately respect their rights and needs)

In the Study of History: Students are studying the end of WWII and the bombing of Hiroshima. The question is raised "Was the bombing of Hiroshima morally justified or did it constitute an act of unnecessary cruelty?". The students are presented with reasoning on both sides of the question. These reasons are debated in small groups. Each student is expected to state and defend his/her own reasoning in support of a moral judgment on this question. Students then read their paper to an assessment team that suggests strengths and weaknesses in their reasoning.

In the Study of Literature: Primary School. In Jack and the Bean Stalk, Jack takes the golden eggs and the golden harp when he is escaping from the Giant. Do you think he was being fair to the Giant in doing this? Explain your reasons for what you think to the person you are paired with. Then we will discuss the question as a class and try to decide together. (Before you would ask the children to do this, it would help if you discussed the subject of fairness with them and the relevant moral principle. With examples)

Evaluative Reasoning

thinking occurs when
we seek to determine the
actual quality of something or
other. Evaluation aims at an objective or reasonable judgment (in contrast to a mere subjective
preference). It is the difference
between the questions "Which of
these two are better?" and
"Which of these two do you
(subjectively) prefer?"

The Logic of Evaluation includes:

- a purpose (what are we trying to accomplish?)
- a subject (who or what are we assessing?),
- 3) <u>information</u> (what facts or data do we have about the subject),
- 4) <u>criteria</u> (what standards are we going to use?), and
- 5) <u>a judgment</u> (that results from conducting the evaluation).

In a **science** class you might ask the students to evaluate the design of a particular experiment ("Is this a well-designed experiment.

In **literature**, you might be concerned with the evaluation of a novel or of a character in a novel.

In a **carpentry** class, you might ask the class to evaluate a cabinet or the framing of a house or any other product of carpentry.

In a **history** class, you might be asked to evaluate the significance of a given historical trend or event.

In **primary school**, you might ask students to evaluate a toy (in comparison to claims for it in advertisement on TV) or to evaluate acquaintances to determine who is their "truest" friend or to evaluate particular characters in a story (as to which is the most honest, or kindest, or most fair, etc...)

Developing skills of evaluative judgment are extremely important. These can be developed only with disciplined practice in evaluative reasoning.

Analytic Thinking

Analytic thinking occurs when we take some whole and use our thinking to take that whole apart, to divide it up in some manner (in order to understand the whole better from the perspective of its parts).

In Teaching Literature

In thinking about literature and coming to understand it, it is often important to think analytically. We often have to see the "parts" of the story in interaction with each other, to see how the logic of the story develops.

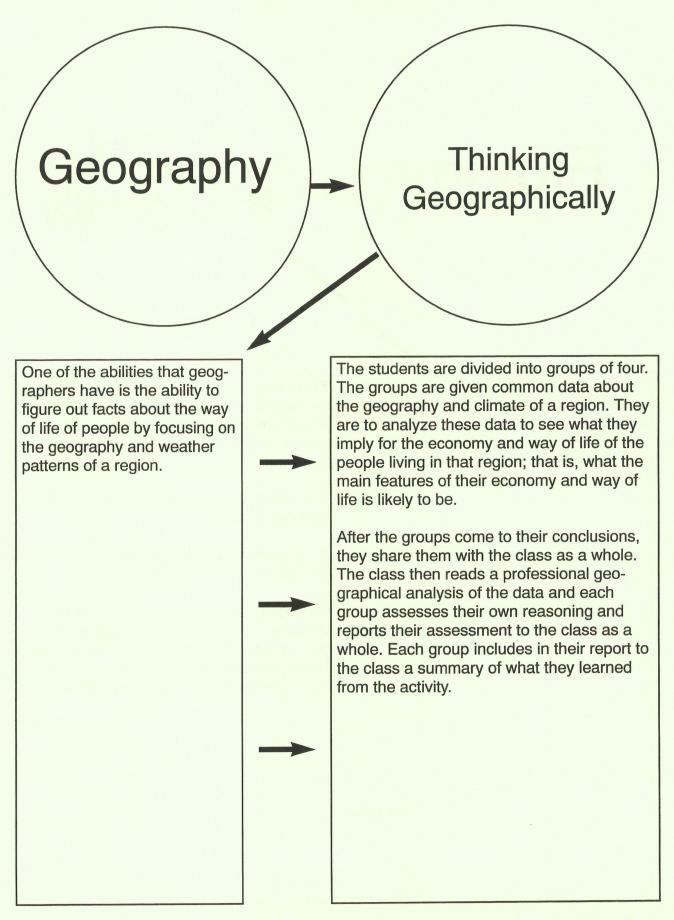
In Teaching Social Studies In thinking about social groups, it is important to recognize that every group has an "in-group" which can always be distinguished from an "out-group". The in-group has privileges that the outgroup does not.

In Teaching Geography
In thinking geographically it is important to distinguish different features of a physical landmass.

The class reads A Christmas Carole by Charles Dickens. Then you explain to the class the concept of "main theme" in a story. You also explain the concept of "subordinate theme". The students are then put into groups of three or four and each group is to decide what they think the main theme of the story is, as well as one subordinate theme. They are to be prepared to support their conclusions with references to events in the story itself.

After you explain the distinction between in-group and out-group, you divide the class into pairs. Each pair is to choose a group that they are familiar with and to make a list of the privileges that in-group members have that the out-group members do not have. The pairs, as they finish, join with another pair. Each pair explains their conclusions. The other groups assesses the accuracy of the conclusions.

You put a map on the wall which has various features of a physical landmass (say North America) depicted. You lead a class discussion in which students identify particular features and indicate their significance.



Thinking Biology Biologically In order to think biologically, Students will work in groups. Each group will you must learn to apply be given a plant. The class will be given a biological terminology to biolist of common terminology (along with a logical phenomena and ask glossary). The groups will be asked to do biological questions. two things: 1) to describe the plant accurately using the terminology, and 2) to generate a list of questions that

emerge from their descriptions.

Each group then reads their description to the class, showing the class the plant they were given. It then reads off its list of questions, indicating why they think each question is important (biologically speaking).

History Thinking Historically

One of the things that historians have to do is distinguish historical facts from historical interpretations.

After a classroom presentation on the difference between historical fact and historical interpretation, each student will be assigned one page of a chapter of the textbook. As homework, they will be asked to identify which of the sentences on their page express historical facts and which express historical interpretations. When they return to class the next day, each student will be put into a group of four. Students will then walk the group through the sentences on their page explaining the conclusions they came to and why. The group members will try to come to consensus on each sentence discussed. The teacher will serve as adjudicator. Each group will then report to the class as a whole on their experience in attempting to distinguish historical fact from interpretation. The teacher will choose the reporter from each group right before the report (to ensure that all students are prepared to report). The teacher will then give feedback to the class as a whole and follow up on whatever problems or frustrations the students are experiencing. For the next day, each student will be asked to find an article from a newspaper and be prepared to explain with examples to what extent fact and interpretation were blended.

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Critical Thinking: Why We Must Transform Our Teaching

By Linda Elder and Richard Paul

The column focusing on critical thinking will be continued in Volume 18 under the authorship of two professionals new to the JDE: Richard Paul, director of the Center for Critical Thinking at Sonoma State University and Linda Elder, vice president at the State Technical Institute at Memphis. Paul, a major leader in the international critical thinking movement, worked with Gerald Nosich to develop a model for the national assessment of critical thinking at the postsecondary level for the U.S. Department of Education. He has authored over 50 articles and five books on critical thinking. In addition to his publishing, presentation of workshops, and development of a critical thinking video series for PBS, he has organized 2 national and 11 international conferences on critical thinking and lectured extensively throughout the world. Elder, an educational psychologist, has broad experience in designing and executing instructional curricula for a wide variety of groups. She has designed and implemented instructional programs which focus on the development of basic academic skills, independent living skills, parenting skills, and employability skills. She has also led workshops on topics such as thinking critically in the classroom and leadership.

We live in a world of flagrant dogmatism and relativism, both radically lacking in intellectual discipline. It is difficult to make a commitment to critical thinking when core societal conventions ignore the vital importance of its role in our development as a culture and as a species. In society, dogmatism, relativism, and uncritical thinking are dominant at all levels. In schools, didactic teaching ensures that students will continue to graduate as undisciplined thinkers—and hence as poor readers, writers, speakers, and listeners—and that students will not learn to reason scientifically, mathematically, historically, or morally (or in any other important way, for that matter). Instead, students will adapt according to the didactic environment in which they are thrust, using rote recall almost exclusively throughout the school experience. It will be a long time, even with rigorous commitment, before we can hope to see the discipline of critical thinking enmeshed into the general thought processes of the human being.

However, there can be no question but that critical thinking is at the heart of our future, not only for our society but for every society in the world. No one can deny three trends gathering momentum in the world today: accelerating change, intensifying complexity, and increasing interdependence. These trends are here to stay. We can never go back to a static, simplistic, or fragmented world. Only those minds which are eminently adaptable and flexible, which are experienced in continually thinking and rethinking about issues and problems, and which do not resist questioning and overturning fundamental notions and practices are ready to cope with this irresistible three-fold force.

In the columns that follow we will introduce the readers of the Journal of Developmental Education to the process by which grass root educators can bring critical thinking effectively into instruction. Each column will deal with one dimension of the process, with a fundamental concept, with a fundamental structure, or with a fundamental tactic essential to critical teaching and learning. In addressing these dimensions, we will discuss the various obstacles to be overcome if one is to become a rational thinker and, in turn, to effectively teach critical thinking skills.

What is Critical Thinking?

Critical thinking is best understood as the ability of thinkers to take charge of their own thinking. This requires that they develop sound criteria and standards for analyzing and assessing their own thinking and routinely use those criteria and standards to improve its quality. Critical thinking, therefore, requires a high degree of continual self-reflection and intellectual discipline. Furthermore, as the standards and discipline of critical thinking become internalized, persons who think critically necessarily develop intellectually and affectively based traits (intellectual autonomy, intellectual civility, intellectual humility, intellectual integrity, intellectual perseverance, etc.). In this sense, critical thinking is not simply a way of thinking but a way of being.

Critical thinking is not something additional to content, but rather integral to it, something which in fact "defines" the manner in which content is organized, conceptualized, and applied by experts in the field. Content is not fragmented bits and pieces of information (which is the underlying assumption in didactic teaching) but a system with a definite set of logical relationships; an organized structure of concepts, principles, and understandings; a system that requires the asking and answering of a certain set of questions and problems; and, ultimately, a disciplined mode of thinking. When one learns "history," for example, one learns to think historically. When one learns "biology," one learns to think anthropologically.

The Idea of Thinking in the Classroom

To introduce critical thinking successfully into instruction there are, broadly speaking, two things that must be understood:

(a) the basic principles of critical thinking and

(b) ways and means for using critical thinking as a fundamental tool for deeply learning the logic of content (this implies both structural and tactical design).

Those who would teach a subject well—that is, so that students learn to think within the logic of the subject—have, therefore, two needs: (a) to become clear about what critical thinking is, and (b) to become adept at facilitating learning so that critical thinking is understood as the means by which students process content.

Educating Educators

One learns critical thinking by doing critical thinking. One learns how to facilitate others' critical thinking in any given subject or discipline by thinking critically about how critical thinking is manifested in that subject. Unfortunately, most educators were taught didactically and, hence, do not grasp how the subject they teach represents a mode of thinking. They have not critically thought through the questions "What is critical thinking?" and "How can it be fostered in the subject I teach?"

The answering of these questions requires that whoever teaches should engage in a variety of activities in which they think through the way critical thinking is embedded in the logic of the content they teach. They need to internalize a set of important concepts about thinking and its facilitation in instruction. This requires in-depth learning and multiple processing of critical thinking principles. Though our columns will provide a wealth of practical examples, they cannot supplant expansive reading and a quality inservice program which makes critical teaching a long-term goal and aims at that goal systematically and realistically.

The Problem of Designing Instruction so That Students Learn to Reason Well

Most of those who are teaching are as unclear about what critical thinking is as they are about how to teach so that their students think critically within the logic of the discipline in which they are teaching. They need to learn—in addition to the theory of critical thinking—how to design structures and tactics that facilitate student learning.

Structures

Structures involve the "what" of instruction: What subject am I going to teach? What content am I going to teach? What questions or problems will be central to the course? What concepts will be fundamental? What amount of information will students need to access? What point of view or frame of reference do they need to learn to reason within? What is my concept of the course? What overall plan shall I adopt? What requirements shall I set up? What grading policies? What performance profiles?

Designing structures. There are a host of structural decisions that influence the extent to which it is likely that students will think critically in a course:

- the way the course is conceived overall
- the general plan for implementing that concept
- the requirements the students must meet
- the grading policies in the course (when applicable)
- performance profiles (that correlate with grade levels)
- · the manner in which the class is divided into units
- the amount of content that is covered
- the way the content is covered
- the patterns in day-to-day instruction

Tactics

Tactics involve the "how": How am I going to teach so as to make the structures work? How am I going to get the students to be actively involved? How am I going to get them to develop insights, understandings, knowledge, and the abilities that are essential? How am I going to get them to learn to "reason" their way to the answers to questions in the field?

Designing tactics. Once we have the most basic structure (and substructures) of our course decided, we must focus on the tactics we will use to enable the structure to be effectively achieved and to facilitate continual critical thinking about the content. We need specific tactics to teach students how to critically read, how to critically write, how to critically speak, and how to critically listen. We need specific tactics to teach students how to assess their own work, how to analyze their own reasoning, and how to improve their own performance, abilities which are fundamental to critical thinking. We need specific tactics to get students to reason well in different content areas. We need specific tactics to help them to transfer their own learning from one situation or context to another.

Ways of Knowing: Making connections Between teaching and learning

HINTH ANNUAL

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Conclusion

In sum, instructional design involves thinking about instruction in both structural and tactical ways. Overall structura thinking—for example, about the concept for the course—canhelp free a teacher from the Didactic Model into which we have been conditioned and the ineffective teaching tha invariably accompanies it. Simple and complex tactical thinking can provide the means by which we can effectively implement our structural decisions.

When evaluating and designing structures and tactics facilitation of critical thinking across the content must be a the core of the planning process. Otherwise teaching strategies can easily regress into the didactic mode where "covering the content" is the primary focus. This teaching obsession of covering content in the didactic sense is, of course, an illusion in that content is not effectively covered if it does not become enmeshed into the thinking process. The only way to adequately produce such enmeshing is through critical thinking.

Our teaching will not be transformed simply because we philosophically believe in the value of critical thinking. We must find practical ways to bring it into instruction, both structurally and tactically. In the columns that follow—"Th Elements of Thought" and "The Standards for Thought"—we will introduce readers of the Journal to tools for achieving this crucial and central organizing educational process.

Linda Elder is vice president at State Technical Institute at Memphis, TN 38134-7693. Richard Paul is director of the Center for Critical Thinking at Sonoma State University, Rohnert Par CA 94928.

Critical Thinking: Developing Intellectual Traits

By Linda Elder and Richard Paul

Critical thinking is more than a set of skills. It defines one's character. As such, it involves intellectual traits or "virtues of mind" such as intellectual integrity, intellectual empathy, intellectual humility, intellectual courage, intellectual perseverance, and so on.

Consider, for example, the important role of intellectual integrity in human thinking. I have intellectual integrity if I am committed to seeking out inconsistencies in my thinking, to identifying moments in my thinking when I am requiring of others that which I am not willing to do myself. For instance, if in a conflict with another person I am incensed because he or she is not considering my point of view, and at the same time I am refusing to consider his or her position, I am acting contrary to intellectual integrity. Put another way, if I expect others to consider my point of view but fail to consider their points of view, I lack intellectual integrity.

Thus, critical thinking necessarily entails intellectual character. If we lack intellectual fairmindedness, we are not able to consider situations from multiple perspectives. If we lack intellectual humility, we are unable to identify weaknesses in our own thinking. If we lack intellectual perseverance, we are unable to think through the complexities of deep issues. If we lack intellectual courage, we are unable to stand up for that which is reasonable in the face of adversity.

Therefore, if we want students to develop as critical thinkers, we must go beyond the teaching of critical thinking skills alone. We must help them develop essential intellectual traits of the mind.

In this column, we briefly lay out the most fundamental of these traits. We then discuss how these traits of mind are inherently interdependent.

Definitions: Valuable Intellectual Traits

Intellectual humility: having a consciousness of the limits of one's knowledge, including a sensitivity to circumstances in which one's native egocentrism is likely to function self-deceptively and sensitivity to bias, prejudice, and limitations of one's viewpoint. Intellectual humility depends on recognizing that one should not claim more than one actually knows. It does not imply spinelessness or submissiveness. It implies the lack of intellectual pretentiousness, boastfulness, or conceit combined with insight into the logical foundations, or lack of such foundations, of one's beliefs.

Intellectual courage. having a consciousness of the need to face and fairly address ideas, beliefs, or viewpoints toward which we have strong negative emotions and to which we have not given a serious hearing. This courage is connected with the recognition that ideas considered dangerous or absurd are sometimes rationally justified (in whole or in part) and that conclusions and beliefs inculcated in us are sometimes false or misleading. To determine for ourselves which is which, we must not passively and uncritically accept what we have learned. Intellectual courage comes into play here because, inevitably, we will come to see grains of truth in some ideas considered dangerous and absurd and distortion or falsity in some ideas strongly held in our social group. We need courage to be true to our own thinking in such circumstances. The penalties for nonconformity can be severe.

Intellectual empathy: having a consciousness of the need to imagina-

tively put oneself in the place of others in order to genuinely understand them, which requires the consciousness of our egocentric tendency to identify truth with our immediate perceptions of long-standing thought or belief. This trait correlates with the ability to reconstruct accurately the viewpoints and reasoning of others and to reason from premises, assumptions, and ideas other than our own. This trait also correlates with the willingness to remember occasions when we were wrong in the past despite an intense conviction that we were right and with the ability to imagine our being similarly deceived in a case-at-hand.

Intellectual integrity: recognition of the need to be true to one's own thinking, to be consistent in the intellectual standards one applies, to hold oneself to the same rigorous standards of evidence and proof to which one holds one's antagonists, to practice what one advocates for others, and to honestly admit discrepancies and inconsistencies in one's own thought and action.

Intellectual perseverance. having a consciousness of the need to use intellectual insights and truths in spite of difficulties, obstacles, and frustrations; firm adherence to rational principles despite the irrational opposition of others; and a sense of the need to struggle with confusion and unsettled questions over an extended period of time to achieve deeper understanding or insight.

Faith in reason: confidence that, in the long run, one's own higher interests and those of humankind at large will be best served by giving the freest play to reason and by encouraging people to come to their own conclusions through developing their own rational faculties. It also includes faith that, with proper encouragement and cultivation, people can learn to think for themselves, to form rational viewpoints to draw reasonable conclusions, to think coherently and logically, and to persuade each other by reason and become reasonable persons despite the deep-seated obstacles in the native character of the human mind and in society as we know it.

Fairmindedness: having a consciousness of the need to treat all view-points alike, without reference to one's own feelings or vested interests or the feelings or vested interests of one's friends, community, or nation. The term implies adherence to intellectual standards without reference to one's own advantage or the advantage of one's group.

The Interdependence of Traits of Mind

The traits of mind essential for critical thinking are interdependent. 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, in turn, we often must empathize with and reason within points of view toward which we are hostile. To achieve this end, we must typically persevere over a period of time, for learning to empathetically enter a point of view against which we are biased takes time and significant effort. That effort will not seem justified unless we have sufficient confidence in reason to believe we will not be "tainted" or "taken in" by whatever is false or misleading in the opposing viewpoint. Furthermore, merely believing we can survive serious consideration of an "alien" point of view is not enough to motivate most of us to consider one 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 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.

To begin at another point, consider intellectual good faith or integrity. Intellectual integrity is clearly a difficult trait to develop. We are often motivated, generally without admitting to or being aware of this motivation, to set up inconsistent intellectual standards. Our egocentric or sociocentric tendencies make us ready to believe positive infor-

mation about those we like, and negative information about those we dislike. We are likewise strongly inclined to believe what serves to justify our vested interest or to validate our strongest desires. Hence, all humans have some innate mental tendencies to operate with double standards, which of course is paradigmatic of intellectual bad faith. Such modes of thinking often correlate quite well with getting ahead in the world, maximizing our power or advantage, and getting more of what we want.

Nevertheless, it is difficult to operate explicitly or overtly with a double standard. We therefore need to avoid looking at the evidence too closely. We need to avoid scrutinizing our own inferences and interpretations too carefully. At this point, a certain amount of intellectual arrogance is quite useful. I may assume, for example, that I know just what you're going to say (before you say it), precisely what you are really after (before the evidence demonstrates it), and what actually is going on (before I have studied the situation carefully). My intellectual arrogance may make it easier for me to avoid noticing the unjustifiable discrepancy between the standards I apply to you and the standards I apply to myself. Of course, if I don't have to empathize with you, that too makes it easier to avoid seeing my duplicity. I am also better positioned if I lack a keen need to be fair to your point of view. A little background fear of what I might discover if I seriously considered the consistency of my own judgments can be quite useful as well. In the example case, my lack of intellectual integrity is supported by my lack of intellectual humility, empathy, and fairmindedness.

Going in the other direction, it will be difficult to use a double standard if I feel a responsibility to be fair to your point of view, see that this responsibility requires me to view things from your perspective empathetically, and behave with some humility, recognizing I could be wrong and you right. The more I dislike you personally, or feel wronged in the past by you or by others who share your way of thinking, the

more pronounced in my character the traits of intellectual integrity and good faith must be to compel me to be fair.

Conclusion

To effectively teach critical thinking, we must introduce students to the intellectual traits. We must help them understand that critical thinking is a pervasive way of being, that it means continually probing and assessing our thinking in the pursuit of developing our intellectual character. It means developing a questioning inner voice which strengthens our character, by routinely asking such questions as:

- "In this situation, what do I really know? What do I think I know but am not completely sure of? What do I need to learn? What do I still need to figure out?" (intellectual humility)
- "Am I uncritically accepting what I have learned, or do I have the courage to question what I have learned? Am I afraid to question certain beliefs or practices because I may be rejected for questioning them?" (intellectual courage)
- "Am I honestly trying to imagine this situation from this other person's point of view? Can I accurately state another person's point of view-which is in conflict with my own?" (intellectual
- "Am I thinking through this issue in a way which does justice to its complexity, or do I come to a conclusion too quickly? Do I give up when figuring things out becomes frustrating?" (intellectual perseverance)

Self-questioning is a crucial element to the development of traits of mind essential for critical thinking. To cultivate the prerequisite virtues of mind within our students is to cultivate critical thinkers.

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TWENTY-FIRST ANNUAL SYMPOSIUM ON DEVELOPMENTAL EDUCATION

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Critical Thinking: The Key to Emotional Intelligence

By Linda Elder

There are many points of view from which teaching can be considered. Instructors can focus on teaching by thinking through the content we want our students to learn. We can look at teaching as requiring that we "handle" the intellectual deficiencies students bring to the classroom. We can look at teaching through the eyes of administration, perhaps concerned with how many students are enrolled or retained in classes. We can consider teaching as riddled with problems arising from complex political realities. But apart from these and other views of instruction, we can consider teaching as either fostering or failing to foster the emotional intelligence of students, as developing or failing to develop their emotional lives. This is a point of view about which little has been written, although it is of considerable importance.

Some might argue that cultivating the emotional lives of students is not the responsibility of education. Yet such a position fails to accommodate the fact that when students relate to instruction, they do so *emotionally*. That is, they feel something about what is going on in the classroom. And that feeling, at least in part, determines how students act in the classroom: whether they want to learn what we are trying to teach them and whether they in fact do learn what we are "teaching."

However valuable it is to understand the part that feelings play in our students' ability to learn content well, there is yet another, perhaps even more compelling, reason why the emotional lives of students should be fostered in the educational process. The quality of each of our lives is ultimately gauged by the feeling states created in our minds. Those feeling states, or emotions, are directly related to the thinking which guides our behavior. In other words, "emotional intelligence" is created by high quality thinking which leads to high quality emotions. Therefore, if we are concerned that our students learn the skills of mind, we must have some understanding of the relationship between the cognitive function of the mind and the affective (or feeling/motivation) dimension of the mind.

What It Means to be Emotionally Intelligent

To understand the concept of emotional intelligence, a brief analysis of the concepts of "intelligence," and "emotions" is necessary. What is intelligence? In standard English usage intelligence is understood as "the ability to learn or understand from experience or to respond successfully to new experiences," "the ability to acquire and retain knowledge" (Webster's New World Dictionary). Its possession implies the use of reason or intellect in solving problems and directing conduct.

What is emotion or feeling? In standard usage, the term emotion is used to designate "a state of consciousness having to do with the arousal of feelings." It is "distinguished from other mental states, from cognition, volition, and awareness of physical sensation." Feeling refers to "any of the subjective reactions, pleasant or unpleasant" that one may experience in a situation (Webster's New World Dictionary).

Given these understandings, how might emotional intelligence be provisionally conceptualized? Most simply, emotional intelligence can be conceived as a measure of the degree to which a person successfully (or unsuccessfully) applies sound judgment and reasoning to situations in the process of determining an emotional or feeling response to those situations. It would entail the bringing of cognitive intelligence to bear upon both positive and negative emotions. It would be a measure of the extent to which our affective responses were "rationally" based. Emerging naturally out of rational emotions would be reasonable desires and sensible behavior.

The Human Mind and Its Functions

To grasp how emotions become, or fail to become intelligent, we need a basic understanding of how emotions operate in the mind and how they relate to other operations of the mind. The human mind is comprised of three basic functions: thoughts, feelings, and desires. The cognitive component of the mind includes mental actions traditionally linked with thinking such as analyzing, comparing, assuming, inferring, questioning, contrasting, and evaluating.

The feeling (or emotional) function is that part of the mind which is our internal monitor, which informs us of how we are doing in any given situation or set of circumstances. Put another way, it is the gauge which tells us whether we are doing well or poorly. Humans experience a broad array of emotions from happiness to sadness, from enthusiasm to depression, from joy to sorrow, from satisfaction to frustration.

The third function of the mind is motivation or will. This part of the mind includes our purposes, goals, objectives, values, desires, drives, and commitments. Our motivation could be viewed as our mind's engine, which revs us up and moves us forward toward some action or slams on the brakes so we can avoid some behavior. As our driving force, motivation plays a substantial role in determining the behavior in which we engage or fail to engage.

These three basic mental functions, although theoretically distinct, operate in a dynamic relationship, continually influencing one another in mutual and reciprocal ways. They function so intimately in our experience that it is only theoretically that we can regard them as distinct. Wherever there is thinking, some related drive and feeling exist. Wherever there is feeling, some related thinking and drive can be found. Wherever there is drive, thinking and feeling are present in some form.

Thinking as the Key to Feelings and Emotions

Despite the fact that thoughts, feelings, and desires are equally important functions of the mind, it is cognition, or thinking, which is the key to the other two. If we want to change a feeling, we must identify the thinking which ultimately leads to that feeling. If we want to change a desire, again it is the thinking underlying the drive which must be identified and altered if our behavior is to alter.

In other words, we change any one of the triad (thoughts, feelings, desires) with thinking. For instance, if you feel depressed, it wouldn't make sense for me to say "don't feel depressed. Just feel satisfied." It is only through thinking that we alter feelings and desires. It is through the displacement of one thought with another that the related feelings and motivations change. You feel depressed, for example, because you think that the situation you are in is hopeless. You are able to change such a feeling only when you think differently about that which you are experiencing, when you think that there is something you can do to change the situation. Such a change in thinking leads to a change in motivation, and, ultimately, a change in action.

In the last analysis, it is our thinking that leads us toward or away from some action and sets us up for some given emotional evaluation of the situation. For example, if I think that the class structure I have designed for my students will enable them to thoroughly grasp the key concepts in the course, I will then experience an emotional evaluation of some kind when I try the structure out on my students. If it works, I will feel satisfied. If it doesn't work I may feel disappointed. Furthermore, I will be motivated toward or away from some action based on the thinking that I do in the situation. If my classroom structure fails to lead to the thinking that I want students to be engaging in, I may be motivated to improve the structure so that it works better to achieve my original purpose. This motivation is based on my thinking that classroom structures can always be improved and that to develop as a teacher involves continually reevaluating my instruction.

The Role of Critical Thinking in Emotional Intelligence

If thinking ultimately determines the quality of our emotions, it follows that critical thinking provides the crucial link between intelligence and emotions in the emotionally intelligent person. In fact, critical thinking is the only plausible vehicle by which we could bring intelligence to bear upon our emotional life. It is critical thinking which provides us with the mental tools needed to explicitly understand how reasoning works and how those tools can be used to take command of what we think, feel, desire, and do.

Through critical thinking we acquire a means of assessing and upgrading our ability to judge well. It is critical thinking that capacitates us to go into virtually any situation and to figure out the logic of whatever is happening in that situation. It provides a way for us to learn from new experiences through the process of continual self-assessment. Critical thinking, then, enables us to form sound beliefs

and judgments, and, in so doing, provides us with a basis for a rational and reasonable emotional life.

When searching for the ingredients necessary for a rational life it is crucial not to underestimate the role of the affective dimension of the mind. To engage in high quality reasoning, one must have not only the cognitive ability to do so, but the drive to do so as well. Wha is more, it is evident that to learn to solve problems effectively, one must have the desire to do so. One must be committed to it. Thus the affective dimension, comprised of feelings and volition, is a necessary condition and component of high quality reasoning and problem solving. In short, the truly intelligent person is not a disembodied intellect functioning in an emotional wasteland, but a deeply committed mindful person, full of passion and high values, engaged in effective reasoning, sound judgment, and wise conduct.

Thus, if we are concerned with helping our students develop the skills they need to become emotionally intelligent, we have no choice but to focus in the classroom on critical skills of mind. We must recog nize that feelings are products of thinking, and that it is only through thinking that feelings become altered. We cannot ignore the fact that students are motivated toward that which they think is important to them. Conversely, we must recognize that students are driven awar from learning when they see no value in it. The ideal instructiona. structures are those that stimulate student thinking, that cause them to analyze the beliefs and values which motivate them to action. It short, we must emphasize the intellectual skills imperative to mind of high quality in an increasingly complex world. It is through these fundamental understandings that we can begin to view instruction as the vehicle to the development of emotionally intelligent students, as emotionally intelligent society, and perhaps even, in the far far dis tant future, an emotionally intelligent world.

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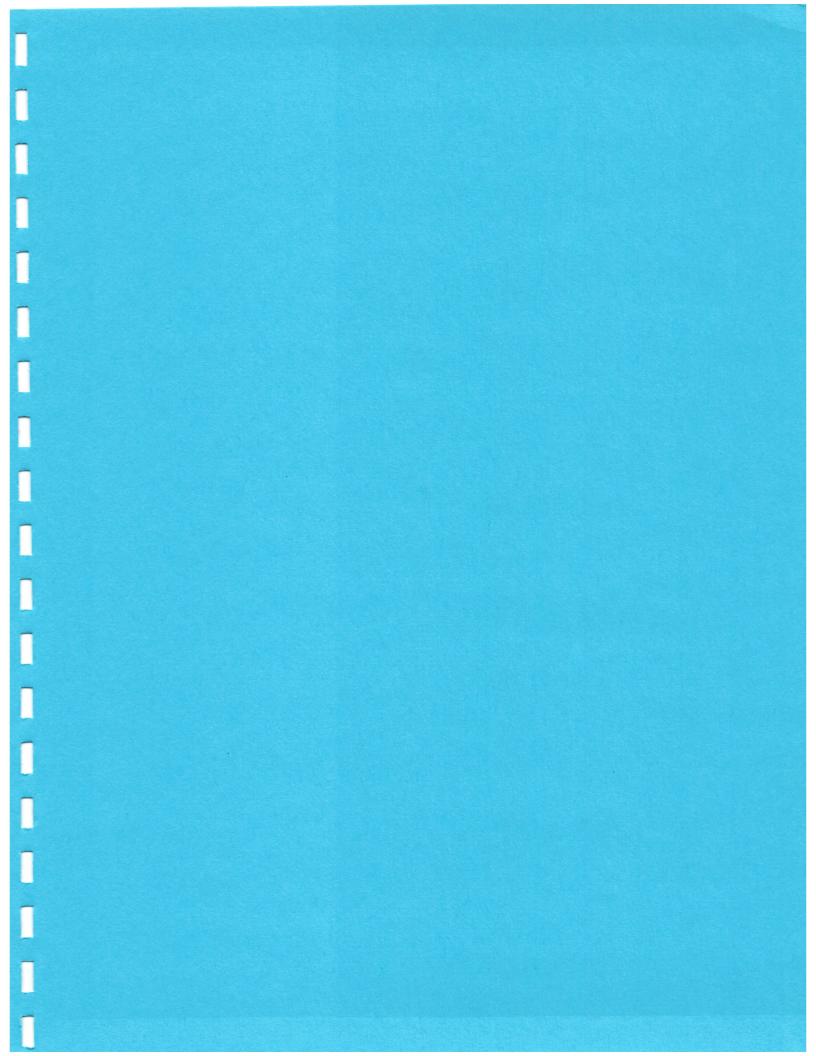
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