Critical Thinking Across the Curriculum: The Wisdom CTAC Program

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Abstract

Discussions of critical thinking across the curriculum typically make and explain points and distinctions that bear on one or a few standard issues. In this article Robert Ennis takes a different approach, starting with a fairly comprehensive concrete proposal (called “The Wisdom CTAC Program”) for a four-year higher-education curriculum incorporating critical-thinking at hypothetical Wisdom University. Aspects of the Program include a one-year critical thinking freshman course with practical everyday-life and academic critical thinking goals; extensive infusion of critical thinking in other courses; a senior project; attention to both critical thinking dispositions and skills; a glossary of critical thinking terms; emphasis on teaching (interactive discussion, using multiple varied examples, teaching for transfer, and making principles explicit); communication at all levels; and last, but definitely not least, assessment. Advantages and disadvantages will be noted. Subsequently, Ennis takes and defends a position on each of several relevant controversial issues, including: 1) having a separate critical thinking course, or embedding critical thinking in existing subject matter courses, or doing both (the last being the position he takes here); 2) the meaning of “critical thinking”; 3) the importance of teaching critical thinking because of its role in our everyday vocational, civic, and personal lives, as well as in our academic experiences; 4) the degree of subject-specificity of critical thinking; 5) the importance of making critical thinking principles explicit; and 6) the possible threat to subject matter coverage from the addition of critical thinking to the curriculum.

Keywords: Critical thinking across the curriculum, critical thinking, CTAC, subject-specificity, generality of critical thinking principles, transfer, skills, dispositions, principles, criteria, critical thinking glossary

Introduction

Critical thinking is a popular goal for higher education, and Critical Thinking Across the Curriculum (“CTAC,” which I pronounce “see tack”) is an appealing approach to teaching critical thinking: It assures that no student misses having instruction in basic critical thinking. It shares the benefits among all cooperating fields of having students learn to think critically. It also shares the responsibility for teaching critical thinking between the first-year separate critical thinking course and subject matter courses, thus assuring that there will be many encountered critical-thinking-requiring examples to help students learn to think critically. Furthermore, it allows us to avoid unnecessary repetition of the introduction of general critical thinking principles and criteria by incorporating these principles and criteria in the separate course at the beginning of a student’s experience, broadcasting this incorporation to all faculty. Lastly, the Program’s main goal is broad and important: the improvement of the critical thinking of students in their vocational, civic, personal, and academic lives.

In this essay I shall first describe the proposed CTAC Program for hypothetical Wisdom University. In other institutions, to the extent that a full commitment does not exist, the results will be less than what they would be if a full commitment did exist, and compromises will sometimes be necessary. I realize that other factors can interfere. Full commitments might take time to develop. But I urge that all institutions start soon, and do the best they can.

A. The Specifics of the Wisdom CTAC Program

1. Goals

There are two broad goals of the Wisdom CTAC Program. The first is to help students think critically in their everyday civic, vocational, personal, and academic lives during and after their university careers. The second is to make their subject matter experiences more exciting and more memorable by thinking critically about issues or questions in the subject matter area. Critical thinking involvement in subject matter issues also helps students remember the critical thinking principles used. We learn what we use.

2. The Basic Course

The Wisdom CTAC Program commences with a two-semester required course for freshmen called “Principles of Critical Thinking,” meeting three hours per week for fourteen weeks each semester (twenty-eight weeks in all).

2.1. First-year course goals. The first-year course
will focus on the first of the above two program goals, but will also touch on the second. The general content of this first course consists of the general dispositions and abilities specified in "The Nature of Critical Thinking" (henceforth "NCT"). (Appendix A, also Ennis, 2011a, 2013a). Examples include the general dispositions to try to be well-informed and to be open-minded, and the general abilities to analyze arguments and judge the credibility of sources. But towards the end of the two-semester course, there will also be an opportunity to experience an application of a few critical thinking dispositions and abilities to specific subject matter areas and to have memorable subject matter experiences.

2.2. Schedule. For the first twenty-one weeks of this course, there will be a variety of exemplifications of the general dispositions and abilities, and the accompanying general concepts, principles, and criteria of critical thinking (NCT) that constitute the content. In the subsequent six weeks, one area per week, one or more general and/or field-specific critical thinking principles are applied in each of six broad subject matter areas, which might be the following areas: the humanities; the social sciences; the physical sciences; the biological sciences; vocational areas, such as business, agriculture, and education; and computation, including such fields as probability, mathematics, statistics, and computers. This will give the students some involvement in, and introduction to, critical thinking in the broad area or a specific field in that area, as determined by faculty in the area. For each area's week, a faculty representative of the area will be in charge of activities, including assignments, content, discussion, and mini-assessment. The final week of the course will be devoted to review of the two-semester course, which will be followed by assessment of the students' success in achieving the goals of the year's course (called "summative assessment").

Furthermore there will be frequent assessment throughout the year of various sorts (called "formative assessment"). Feedback to students will be quick, and special clarification sessions will be available and numerous.

Concurrently, there might be a one-year course for freshmen called "Writing Across the Curriculum." Ideally there would be coordination of critical thinking and writing instruction across the curriculum, but this possible combination is not explored in this proposal. The proposal's expansion to provide such coordination would result in greater challenges than the current proposal presents, which, because of its novelty, will already result in some adjustment problems. But ultimately the coordination of critical thinking and writing across the curriculum would probably be a good idea for most institutions.

What I have just said about the first-year critical thinking course is about goals and structure, not methods of teaching. As will be seen in Section 6, I recommend interactive methods of teaching (such as issue-oriented discussion), as well as content-oriented didactic methods, for not only general but especially for teaching and learning of somewhat subject-specific critical thinking dispositions and abilities.

3. Infusion of Critical Thinking in Other Courses

Because promoting learning to think critically is part of the Wisdom University's mission, it is expected that each field will make some contribution and will develop a plan and approach in its courses that promotes both general and somewhat field-specific critical thinking by students within each field for the rest of their undergraduate careers. This infusion will be accompanied by examples of applications of general critical thinking principles not only in the field of the course, but also in their everyday non-academic lives. Furthermore, advanced critical thinking practices and their associated principles and criteria that are not general, for example, analysis of covariance and sampling in the social sciences, will be infused in subject matter courses or programs. This sort of infusion is common for advanced doctoral study and dissertations, and can be extended down into undergraduate study. (Actually, a two-semester course in statistics and research methods for curricula in the social sciences is enlighteningly analogous to the first-year CTAC critical thinking course for the entire higher education curriculum.) The plan for these contributions will be developed within each field with the help of critical thinking consultants, if needed, and will respect the talents and interests of the faculty in the field, as well as the subject matter of each field.

This is a rough formula in order to accommodate the variations among fields and faculty members. No doubt some courses will utilize little or no critical thinking and will have as their primary function, students' acquisition of subject matter in preparation for other courses or post-higher-education situations. Nevertheless, most courses should offer concrete opportunities for students to develop and apply critical thinking skills and dispositions that will be beneficial to them throughout their vocational, civic, personal, and academic lives.

One problem sometimes mentioned by my colleagues is that students do not know enough about the subject to think critically in the subject. For example, freshmen in physics do not know enough to think critically about quarks, black holes, and relativity. This is true, but there are two ways to deal with it.

First, have students do critical thinking about problems that call for subject matter that they do understand (such as planning an experiment to test Newton's First Law of Motion, an example that I will develop later). Second, students do not need to become advanced subject-matter experts before they can start to learn to think critically in a subject. These things can proceed together, each helping the learning of the other. Students will remember best the subject matter they use (e.g., in making
decisions and judgments). However, this approach would work only if there is not much of a gap between their level of subject matter competence and the subject matter knowledge required to deal with the issue. Put simply, we should not ask freshmen in physics to think critically about issues regarding quarks, black holes, and relativity.

All of this assumes that familiarity with the subject is important in doing critical thinking about the subject. I wholeheartedly accept this assumption, but do not think that it justifies not learning to do critical thinking at levels of subject matter that might be slightly ahead of them. Dealing with issues calling for critical thinking in subject matter that they are learning promotes both subject matter learning and learning of critical thinking.

4. Senior Project
Each student will do a senior project in some field or subject (or combination thereof), the final report for which will include not only a description of the project, including its research procedures, specifying and defending its main theme or thesis, but also an exemplified list of the general and somewhat subject-specific critical thinking dispositions, abilities, principles, and criteria employed by the student in doing the project. The project will be advised, monitored, and evaluated by one representative, or a committee of representatives (preferably the latter), of the field or subject, probably with some help from a critical thinking consultant.

5. Coordination
Considerable coordination among the elements of this total CTAC Program is needed.

5.1. Critical thinking content. The set of general critical thinking principles, criteria, abilities, and dispositions used in the six field-specific weeks of the first-year critical thinking course must be accessible and clear not only to teachers of the first twenty-one weeks of that course but to teachers of any other subject matter course that might or will make use of what is taught in the first-year course. Usable presentations of this material (possibly a combination of 1) NCT, 2) a fairly short general description of critical thinking (to be presented later under the label, “A Super-Streamlined Conception of Critical Thinking”), and 3) a detailed critical thinking text book with examples and discussion), as well as the advice of critical thinking consultants, will be made available to all faculty involved. Furthermore there will be faculty discussions of the meaning, application, teaching, and assessing of the principles and criteria. Some discussions will be organized by a CTAC office, some by departments and other units, and some informally.

5.2. Gaps and repetition. The first-year introductory course is the primary assurance that there will not be large omissions in students’ experience with general critical thinking dispositions, concepts, principles, and criteria. Because it is usually helpful to have a wide array of examples of applications of general critical thinking concepts, principles, and criteria, I do not worry much about repetition of the principles of critical thinking, if they are exemplified in different ways in both the first course and the subsequent subject matter courses.

5.3. Glossary. A common set of critical thinking terms and a set of definitions of these terms must be agreed on and made available in order to avoid confusion. Such terms as “denotation,” “connotation,” and “logic” (each of which most philosophers use in a different sense than the sense used by specialists in English), “hypothesis,” “best-explanation argument,” “statistically significant,” “straw person,” and “genus-differentia” require either specification of one meaning in a glossary, or the special labeling of different meanings, for example: “‘denotation’ in the sense used in philosophy,” and “denotation” in the sense used in English.”

5.4. Communication. Various avenues of communication among participants must be available through such means as a university-wide newsletter; annual reports; consultancy by critical thinking consultants who know the subject matter into which critical thinking is infused and are familiar with ways of doing the infusing; and intra-department discussion, planning, and meetings about how to infuse critical thinking in the subjects taught by that department.

5.5. Staff. There will be a central CTAC office responsible for coordination activities. It will be run by a director, and can provide an academic home for some critical thinking specialists, some of whom will be teachers in the first-year course, and some of whom will be teaching consultants, who specialize in, or are at least well-informed in, the fields into which critical thinking will be infused and in methods of teaching critical thinking. Perhaps some will perform both functions. Attached to this office, there will be a first-course supervisor and a part-time specialist in critical thinking assessment, and there will be secretarial help.

5.6. Control. To oversee the total operation, including the CTAC office staff, there will be a Steering Committee that meets regularly, chaired by one of its members. The Chair’s role is probably a quarter-time appointment. The Steering Committee is responsible to the total Wisdom University Faculty through an annual report and review. The Steering Committee will monitor the teaching of the first-year required course, and each field’s, subject’s, or area’s plan for infusing critical thinking in its subject-matter instruction. It will also supervise the assessment of the critical thinking of the students in both the first-year course and in the subject matter courses in which critical thinking was infused.

This description of administration and control assumes that Wisdom University is basically controlled by faculty. In higher education situations in which the power figures are legislators, boards of directors, presidents, deans, and department heads, these figures or their appointees would perform the key roles and functions.
Various accommodations would be made for in-between situations, but the functions must be performed.

6. Teaching
The actual infusion of critical thinking in subject matter instruction is affected by the nature of the subject matter, as well as many institution-specific factors, such as student and teacher backgrounds and interests, teacher style, teacher grasp of critical thinking, student grasp of the subject matter, class size, cultural and community expectations, student expectations, colleagues' expectations, the amount of time available to teachers, and the funds available for development, consultation, and help. Much variation can be expected.

The selection, “Twenty-one Strategies and Tactics for Teaching Critical Thinking” (Appendix A; also Ennis, 2013b, 2011b) indicates the Program’s general recommended approach to teaching, but must be adjusted to accommodate institution-specific factors. Four underlying guidelines that apply widely are 1) to engage in interaction/invitation, 2) to use multiple varied examples, 3) to teach for transfer, and 4) to make critical thinking principles and criteria explicit. I shall elaborate:

6.1. The interaction/invitation principle. Critical thinking is often best taught in ways that call for students to interact with each other and the teacher in activities that call for critical thinking in resolving issues in which they feel involved. “Twenty-One Strategies and Tactics for Teaching Critical Thinking” in Appendix B suggests ways of engaging in interaction/invitation teaching. Although interaction with the primary instructor is less likely with large classes, it often can still occur among students in discussion sections and small group work.

I vividly remember an example of interactive critical thinking teaching I did when I was a high school general science teacher dealing with Newton’s Laws of Motion. Some students questioned his First Law, which holds roughly that, unless acted on by an external force, a body in motion remains in motion in the same direction and speed, and a body at rest remains at rest. These dissenting students, based on their everyday experiences, including delivering newspapers by tossing them off a moving bicycle, had adopted Aristotle’s view that a body in motion naturally slows down and falls to the ground.

We had a heated discussion and, after wondering how to settle the matter, came up with an experiment. We would each sit in the back seat of a moving automobile with the windows closed, and throw a ball into the air to see whether it would move to the back of the car on its way up and down, as would be expected on the basis of the students’ theory of motion. From Newton’s First Law one would predict that the ball would not drift to the rear of the car because air resistance to the ball’s existing forward progress would be eliminated and there would be no other force interfering with the ball’s forward motion with the car.

But this experiment, some students realized, would have the weakness that we could not be sure that the ball had been thrown straight up. So they came up with the idea of releasing the ball just under the roof, and seeing whether it moves toward the back on the way down (thus defeating a plausible alternative hypothesis). This change was an important development. The students themselves realized weakness in the plan and suggested the change. This greater participation made them more deeply involved.

We agreed to try this out over the weekend. At the beginning of the following week we discussed the results, and the ways they could have gone wrong.

The point I want to make is that the students, because of their deep involvement in the issue and participation in the discussion, remembered Newton’s First Law and mentioned it and our experiments to me later in their school careers. The critical thinking/subject matter interactive activity had enhanced their learning and enthusiasm for the subject and critical thinking.

Michael Scriven (personal communication during a session of the May, 2013 meeting of the Ontario Society for the Study of Argumentation (OSSA) at the University of Windsor at which an earlier version of this paper was presented) has cautioned that the tone of this CTAC proposal with its emphasis on the critical thinking principles and criteria as content (as presented in Appendix A) invites neglect of the interaction/invitation approach to teaching of critical thinking in favor of a simple didactic approach. In the didactic approach, the course might well be organized just as "The Nature of Critical Thinking" in Appendix A is organized. The proposal's emphasis on assessment (which is likely to be organized in terms of critical-thinking subject matter in a table of specifications for tests) might also be felt to invite a simple didactic approach.

Scriven urged that these invitations to didactic teaching not be accepted. I roughly agree with him to a point, but there is also a role on occasion for organized didactic presentations of subject matter. The exclusively interactive/invitation approach is difficult to implement if we respect the need for coverage of the ideas in "The Nature of Critical Thinking". Numerous varied examples, organized coverage, interaction among students in groups and other ways, as well as interaction between students and instructor, are all needed in a blended approach, taught by a skilled instructor. See Appendix B ("Twenty-one Strategies and Tactics for Teaching Critical Thinking").

6.2. Multiple varied examples. A variety of examples of the application of critical thinking principles and criteria, thoroughly examined, is usually needed for students to grasp critical thinking principles and criteria. This is one important reason for infusing critical thinking in various subject areas.

6.3. Transfer. Transfer of learning to new con-
texts usually occurs when and only when we teach for it—which generally means that we deliberately make it clear to the students in a variety of situations and/or subjects what a principle or criterion is, how it applies in these situations, and ask them to apply the principle or criterion to other situations. For example, the conflict-of-interest principle for judging credibility of sources could be exemplified in course material; then students could be asked how it applies in, for example, a recent financial scandal in local politics, and the topic could be discussed.

Another example: Basic logical relationships (such as “if-then,” “not both,” “if A and B, and C, then D” and “C, only if not A or B, etc.”) could first be exemplified and then interpretation could be requested or a judgment discussed in the income-tax context in this example, courtesy of the Internal Revenue Service (2012):

Tax Manual: “If your spouse is a nonresident alien, he or she must have either an SSN or an ITIN if:
You file a joint return.
You file a separate return and claim an exemption for your spouse, or
Your spouse is filing a separate return.”
Filer: “Since my spouse is not filing a separate return, we are not filing a joint return, I am not filing a separate return, and I am not claiming an exemption for her; then she does not need to have either an SSN or an ITIN.”

Question: “Is the filer correct? Why?”

In this example, a rule is quoted from an income tax manual, followed by a tax filer’s conclusion drawn from the rule. Teaching for transfer could well focus on considering whether the tax filer was correct in drawing the conclusion he or she drew and why, probably symbolizing the argument. To assess for transfer, students could be asked to symbolize the argument and to judge whether the filer was correct, explaining why. Or the students might not be asked to symbolize the argument, and only asked whether and why the filer was right. Then we could watch to see whether the students have learned to symbolize arguments even if not asked to do so.

These two real-life examples, which are very unlikely to be subject matter in any course taken by most students, can be used to promote, or to assess for transfer of, critical thinking principles in a new content.

These examples not only suggest contexts that might be used to teach for and assess transfer of critical thinking principles to contexts in which they were not taught, but also remind us that there is much content we face in everyday life that is not part of our educational experience, but that calls for critical thinking. Since it behooves us to think critically in such contexts, these examples suggest a reason to support the conclusion that an important goal of critical thinking is thinking critically in everyday vocational, civic, and personal contexts, whether or not these contexts were explicitly covered in our education.

A leading contemporary psychologist in the area of critical thinking, Diane Halpern (1998, 2014), has suggested a helpful four-part approach to teaching for transfer. These parts are attention to dispositions, skills instruction, examination of the structural aspects of problems and arguments, and metacognition (thinking about your thinking). As I interpret her position, she holds that the critical thinking dispositions and skills are more likely to transfer to other areas if we are sensitive to the structure of the original and new situations, and if we think about our thinking.

6.4: Making principles explicit. At some point in a discussion, someone should make the applicable critical thinking principles, etc., explicit. The teacher might state them, might invite a student to do it, or praise a student’s doing it, etc. In any case, the teacher should check to make sure that the concepts, principles, and criteria are made explicit, unless they are abundantly obvious. This contention arises from my experience teaching critical thinking, but is supported by the research of Lehman, Lempert, and Nisbett (1988); Nisbett (1993); and Kosonen & Winne (1995). (I appreciate the help provided me for this discussion of teaching by Diane Halpern’s (2014) review of the literature.) I shall further discuss this explicit-principle recommendation in Part 2 of this essay, when dealing with some controversial issues underlying the Wisdom CTAC Program.

7. Assessment

It is easy to leave our decisions about assessment to last, or to forget them altogether—until we feel the pressures of accrediting agencies and the accountability movement, or realize that we do not have evidence of success or failure, and therefore students do not have guidance about their degree of success. But this is a topic that must be addressed early and continuously, especially if we want to do pre/post assessment (itself a controversial issue, given the usual need for a control group). It is a topic about which critical thinking specialists are usually not well informed, though there are a few items that might be consulted (Norris & Ennis, 1989; Fisher & Scribner, 1997; Ennis, 2008; Poskin, 2008; and Sobocan & Grover, 2009). Primary responsibility for initiating Wisdom-wide assessment of critical thinking will be in the hands of the central CTAC office, monitored by the Steering Committee, but individual students, faculty, department, and larger units will need localized assessment, including frequent feedback and information about results. One part-time member of the central CTAC office will be an assessment specialist, who will encourage and give guidance for frequent course-specific, as well as Wisdom-wide, assessment and feedback.

8. Advantages of this Proposal
8.1. It is a concrete proposal that can guide the pursuit of the critical thinking goal that we find in many mission statements.

8.2. It promotes students’ critical thinking not only in their everyday lives but also in their subjects of study.

8.3. It is in accord with the principles of interaction/involvement, example, transfer, and explicitness, and invites students to think about their thinking (metacognition).

8.4. It fosters the increased comprehension and retention of subject matter when students participate in subject matter discussions calling for critical thinking.

8.5. Its conception of critical thinking is comprehensive, detailed, and important in our everyday lives as well as in various fields of study.

8.6. It provides coordination activities that are needed when a number of different academic interests are combined in pursuit of the critical thinking goal. Interaction among faculty and fields will be increased by these coordination efforts, as will students’ seeing the critical thinking similarities and dissimilarities between and among various fields.

9. Disadvantages of the Proposal

9.1. It requires adjustment to change on the part of many participants.

9.2. Some subject matter coverage could be decreased due to the time and energy devoted to infusing critical thinking. (On the other hand, coverage is useless if material is covered but is not remembered.)

9.3. Implementing this proposal will add to institutional expenses, at least in the beginning.

9.4. New disagreements among faculty, including those from differing fields, might develop in their efforts to assume, or avoid, tasks in the new structure.

9.5. The higher education community has little experience with such programs.

B. Background Distinctions and Issues

I have developed the Wisdom CTAC proposal in the light of a number of distinctions and issues that have involved critical thinking community over the years:

1) The choice among having a separate critical thinking course vs. the embedding of critical thinking in subject matter courses vs. doing both;

2) The meaning of “critical thinking”;

3) The importance of teaching critical thinking for its role in our everyday vocational, civic, and personal lives, as well as in our academic experiences;

4) The degree of subject-specificity (or “domain-specificity”) of critical thinking;

5) Approaches to embedding critical thinking, including the difference between infusion (making critical thinking principles and criteria explicit) and immersion (not making them explicit); and

6) The possible threat to subject matter coverage from the addition of critical thinking to the curriculum.

To each in turn:

1. Separate Critical Thinking Course vs. Embedding in Subject Matter Courses vs. Both

Often when the question arises about how to introduce critical thinking in a curriculum, the two alternatives, separate course vs. embedding in subject matter courses, are assumed to be the only alternatives. I support a third alternative, that both be done, an alternative that is often ignored. Robert Sternberg (personal communication) suggested the label “mixed approach” for this third alternative. One important advantage of the mixed approach is that it provides a much larger number and variety of examples of the application of critical thinking principles than does the separate-course approach.

Another is that it provides applications that students will believe to be significant, assuming that they think their subject matter courses have significant content. A third is that it provides an early, organized, comprehensive presentation and explanation in depth of general principles of critical thinking that students will need in their daily lives and in their fields of study, thus ensuring that basic comprehensive general critical thinking is included in everyone’s education. A fourth advantage, at least in the Wisdom situation, is that there will be a common source on the Internet (http://criticalthinking.net) of the basic principles taught in the Wisdom CTAC Program.

2. The Meaning of “Critical Thinking”

Another fundamental issue is the definition of “critical thinking.” Because there are “myriad definitions of critical thinking” (Ralph Johnson, 1986, p. 216) and many expressions of similar themes. I shall unavoidably neglect some specific ones, and apologize to authors of those not specifically represented in this discussion.

2.1. Dewey’s Definition. Dewey’s original definition of what he then called “reflective thinking” was “active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends” (1933, p. 9 (first edition, 1910)). John Dewey’s “reflective thinking” was endorsed and renamed “critical thinking” by the Progressive Education Movement in the 1930’s and 1940’s. Critical thinking then developed support independent of Progressive Education in the middle of the Twentieth Century (when I coincidentally started working in the area), with major independent support developing around 1980, in part I believe as a reaction to the confusion and conflicts of the Vietnam War Era. Interest in critical thinking has been expanding rapidly ever since. In my opinion, Dewey is the grandfather of the current critical thinking movement.

2.2. Dewey’s Descendants: Fairly direct descendants of Dewey’s approach are definitions offered by Siegel (1988), Johnson (1996), Fisher & Scriven (1997), and me (2011), among others. But there are variations. My
definition, which explicitly underlies the proposal for the Wisdom CTAC Program, is, “Critical thinking is reasonable reflective thinking focused on deciding what to believe or do.” One key feature of this definition was introduced in the early 1980’s as I was attempting to make the definition more sensitive to everyday usage. That is, Gerald Nosich (personal communication) urged that the end result of critical thinking can be not only a decision about what to believe, but also a decision about what to do. This insight seemed a good one and I added the last two words (“or do”) to the definition.

This action component is shared with Dewey, as can be seen in his subway example (1933, pp. 91-92). It is also shared with Siegel (1988, p. 2) whose basic definition is that a critical thinker is one who is “appropriately moved by reason.” But the action component is I suspect not shared by Johnson (1996, p. 226), whose definition is “thought evaluating thought,” which he elaborates thusly: “critical thinking is the articulated judgment of an intellectual product arrived at on the basis of plausibility considerations of the product in terms of appropriate standards (or criteria).” Nor I suspect is the action component shared by Fisher & Scribner: “skilled and active interpretation and evaluation of observations and communications, information, and argumentation” (1997, p. 21).

I believe that an affirmative position regarding the evidence of “to do” is appropriate because decisions about what actions to take are important decisions, because similar criteria are applied to decisions about what to do and decisions about what to believe; and because thinking about what to do is part of the meaning of “critical thinking” in such primary contexts as education mission statements, tests (e.g., the currently-popular Collegiate Learning Assessment (CLA) test’s “Performance Tasks” (Council for Aid to Education, no date)), and media mentions of critical thinking. For example, critical thinking is the top item in a Forbes Magazine listing of the “ten skills that will get you hired in 2013” (Casserty, 2012), and the context of this claim strongly suggests an interest in reasonably deciding what to do.

Another key feature of the definition used by the Wisdom CTAC Program is the implicit inclusion, noticed by Sharon Ballin (1985), of creativity in critical thinking because of the need to be creative in developing experiments to test hypotheses, developing examples and counter-examples, etc. Presumably the inclusion of creativity in this way would be a part of most approaches to critical thinking.

A third key feature of the definition of critical thinking used by the Wisdom CTAC Program is its association with the explicit elaboration of a detailed conception consisting of dispositions and abilities (given in NCT, Appendix A) based on the one-sentence overarching definition quoted above, which expresses the concept of critical thinking. This concept-conception distinction is analogous to John Rawls’ (1971) distinction between the relatively concise definition that expresses the concept of justice and the more detailed spelling out of what he feels justice involves by way of a particular conception of justice. In 1957 I commenced developing the detailed conception by consulting the historical philosophical literature about good thinking (e.g., Plato, Aristotle, Francis Bacon, John Stuart Mill (1872), John Dewey (1933), Cohen & Nigel (1934), and Max Black (1952), who in 1946 authored the first text named Critical Thinking) by subsequently asking the question “In what ways can we go wrong when deciding what to believe or do?” and by organizing the results. This connection of a concept of critical thinking (the one sentence definition given above) with a detailed conception of critical thinking (the NCT) is an important feature of the Wisdom CTAC Program. The conception is where we really see what the approach is all about. NCT provides a detailed informative set of goals (though not methods of teaching) for the first-year introductory critical thinking course, and for the general critical thinking aspects of other courses.

2.3. Departures from the Deweyan Tradition. Definitions of note that are not directly in the Deweyan tradition include “persuasive thinking” (various proponents), and “metacognition” (for example, “thinking about your thinking while you are thinking in order to make your thinking better” (Richard Paul, n.d., p. 71)). The trouble with persuasive thinking as a definition is that many persuasive moves are fallacious. The metacognition definition captures an important mental process that should at least often be going on while thinking critically (as many psychologists (e.g., Halpern, 1998, 2014) have urged) but it does not reasonably constitute critical thinking. One could engage in metacognition extensively and yet think quite fallaciously using false principles of critical thinking.

A rather different approach to the meaning of “critical thinking” includes all concepts used in making a decision. Under this view, cell is a critical thinking concept, as Gerald Nosich urged in a televised discussion he and I once had. I hold that cell is not a critical thinking concept, though it is a very important concept in biology. If we allow our conception of critical thinking to include every concept involved in making decisions about what to believe or do, then critical thinking itself would be a much less useful concept. By including everything, it loses focus and includes whatever we teach, no matter what it might be. The conception of critical thinking in NCT does not include concepts such as cell as a critical thinking concept.

2.4. Even further from Dewey: Politically-motivated definitions. It is politically important for us to resist certain definitions because they make critical thinking look bad or confusing in the eyes of the public. Some definers use “critical thinking” as a label for things they oppose.
One such definition is “negative thinking” (Michael Roth, 2010). Roth takes one of the dictionary meanings of “critical” (negativity), combines it with “thinking,” and uses it as a label for much of the thinking that he claims to see in undergraduates, negative thinking, and calls it “critical thinking.” He then offers his alternative approach to higher education.

(John McPeck’s “reflective skepticism” (1981, p.8) sounds as if it is in the negative thinking camp. However, as he develops it, it seems to be similar to the mainstream definitions, but with the restriction that its significant aspects apply only to specific subject matter areas. According to McPeck, there are no significant general critical thinking principles, that is, no significant principles of critical thinking that are not subject specific.)

Another type of politically-motivated definition is one that opportunistically emphasizes what is happening in a course or curriculum promoted by the definer, regardless of whether it refers to what is emphasized or assumed in mission or media statements. Such definitions can then be used to support the status quo in the field, offering the curriculum and the definition. A possible example of such opportunistic definitions is the “race-class-gender reductionism” that Peter Wood (President of the National Association of Scholars) in a communication on AILACT-D, the internet discussion list of the Association for Informal Logic and Critical Thinking (AILACT), claims, mistakenly I believe, is “the meaning of ‘critical thinking’ that prevails in American higher education.” Wood holds that the advocacy of what he calls “race-class-gender reductionism” is labeled “critical thinking” by its advocates in the humanities, and he challenges that movement under both labels.

Actually, in other communications Wood endorses what we in the field of critical thinking tend to think of as critical thinking, but he does not call it “critical thinking.” I do not think that either Roth’s or the definitions Wood mentions are serious contenders for the concept of critical thinking used in the media, in higher education mission statements, in critical thinking tests, or by people who consider critical thinking as their field of study. But we must make that clear when the question arises, keeping in mind that the arguments about such politically-motivated definitions are tricky.

A possible response to such approaches is to request the use of standardized critical thinking tests with adequate controls, possibly challenging the definer (and everyone else) to show through pre/post or post-test only testing that what they are promoting advances students’ critical thinking.

Unfortunately there are dangers. In pre/post comparisons, it can happen that a pretest is so easy for students in a field or curriculum that the test in effect has a ceiling for them, and even if they actually improve a great deal in critical thinking in a given curriculum, it does not show up in a pre/post comparison. This danger was mentioned for the pre/post administration of the College Learning Assessment or CLA test (Council for Aid to Education, no date) by Teresa Sullivan, President of the University of Virginia, who stated that when she was Provost at the University of Michigan, freshmen “scored so high, there was no way for seniors to score higher” (De Vise, 2012, p.7A). (The CLA test was recently revised under the title, CLA+, perhaps partly to deal with this problem.)

Generalizations of this danger in pre/post testing are the lack of a control group, when there is none, and the difficulty of getting a comparable control group even if there is one.

There is a different problem when only a single administration of a test is used at the end of students’ courses of study. The test scores of students who are already good critical thinkers when they arrive at an institution can make their course of study look good if they are given a test only at the completion of that course of study. So even though the use of tests seems like a good idea, we must be wary. See Ennis (2008) for a discussion of traps in critical thinking assessment.

To summarize this discussion of critical thinking definitions: The definition underlying the Wisdom proposal, which is in the Dewey tradition, seems to capture what is generally meant by “critical thinking,” refers to an important and useful process, and is elaborated by the detailed conception of critical thinking shown in NCT, which consists of important and useful concepts, principles, and criteria in making reasonable and reflective decisions about what to believe or do.

Dealing with definitions of “critical thinking” is not easy. The arguments can be tricky.

2.5. A Super-Streamlined Conception of Critical Thinking. For some situations there is a much shorter approach than NCT to defining critical thinking that to a large extent captures the essence of the one-sentence CTAC definitions combined with the lengthy NCT, and is useful for quick communication. It combines dispositions and abilities into one set of twelve characteristics of a critical thinker, and does not mention criteria or specific principles. I call it “A Super-Streamlined Conception of Critical Thinking” or SSCCT (Ennis, 2011a, p. 12), and a number of people have found it useful. With some reservations, I recommend it for situations requiring brevity:

A Super-Streamlined Conception Of Critical Thinking (SSCCT)

A critical thinker:
1. Is open-minded and mindful of alternatives
2. Desires to be, and is, well-informed
3. Judges well the credibility of sources
4. Identifies reasons, assumptions, and conclusions
5. Asks appropriate clarifying questions
6. Judges the quality of an argument, including
its reasons, assumptions, evidence, and their degree of support for the conclusion.
7. Can well develop and defend a reasonable position regarding a belief or an action, doing justice to challenges.
8. Formulates plausible hypotheses.
9. Plans and conducts experiments and investigations well.
10. Defines terms in a way appropriate for the context.
11. Draws conclusions when warranted— but with caution.
12. Integrates all of the above aspects of critical thinking.

While the Super-Streamlined Conception is very useful for communicating a feel for what critical thinking is, I have some reservations about it because it is not very helpful in detailed planning or in formulating a table of specifications for making a critical thinking test.


Should the goal of critical thinking instruction be to teach students so that they will think critically only in a subject or topic they are studying, or also in all aspects of their present and future vocational, civic, personal, and academic lives? Most public endorsements of teaching critical thinking assume that the ultimate goal should be the latter (e.g., Casserly (2012), Arum & Roksa (2011), and many college mission statements). But in my experience many subject matter teachers at the undergraduate level actually support the promotion of critical thinking only within their subject matter, if they support the promotion of critical thinking at all. Some assume that the critical thinking they are teaching will automatically transfer to daily life and to other subjects. Some are not concerned about the daily-life critical thinking goal for higher education, and some just believe that teaching critical thinking for transfer to other areas is not their job.

The goal of teaching critical thinking in the Wisdom CTCA Program is not merely teaching students to think critically in their college subjects, although such teaching is an integral part of the program. The goal is primarily to teach people to think critically so that they will extend it to their everyday lives, which includes their current study of their higher education subjects. It also includes situations that are not even covered by the subjects they studied, such as choosing political candidates in elections, buying insurance, deciding whether to join Facebook, dealing with the taxing authorities (and understanding the complicated rules for taxation), raising children, and getting along with one’s partner, fellow workers and neighbors. This issue about the application of the goal to present and future vocational, personal and civic experiences is an issue that is often neglected in debates about the importance of incorporating critical thinking in the offerings of an educational institution. The potential life-long application of critical thinking is an important justification for the Wisdom CTCA Program.

4. Subject (or Domain) Specificity of Principles and Concepts in Critical Thinking.

Some people interested in teaching critical thinking (for example, John McPeck, Susan Carey, Lauren Resnick, and Robert Glaser) hold that all critical thinking is subject- (or domain-) specific, so it must be embedded in subject-specific instruction, implying that it is a mistake to have a separate general critical thinking course of the sort I envision for the freshman year. To deal with this view I shall distinguish between two kinds of subject-specificity (Ehms, 1989, 1990), conceptual subject-specificity and empirical subject-specificity. I argue that neither kind rules out having a separate critical thinking course.

4.1. Conceptual subject-specificity. Conceptual subject-specificity is the view that there are no non-trivial general principles of critical thinking at all, and that all significant critical thinking principles are specific to the subject, domain, discipline, area, field (e.g., John McPeck, 1981, 1990), or some other vague label. I say “vague” here because I have seen no plausible ways to distinguish among subjects, domains, disciplines, or fields in a way that makes this subject-specificity claim plausible. For example, are statics and dynamics each a separate domain that shares no significant critical thinking principles with the other, or are they sub-domains of mechanics? Are mechanics and electricity separate domains, neither of which shares critical thinking principles with other domains, or is each a sub-domain of pre-relation physics? Is physics a different domain from science? Which of these is it that allegedly has its own critical thinking principles, none of which are shared with other domains? I cannot see any way to distinguish areas of study such that each area shares no critical thinking principles with other areas. Furthermore, I cannot find any critical thinking principle that belongs to one domain only. In any case at least most principles of critical thinking are not specific to only one subject matter area. All (or at least almost all) are general to some extent, regardless of what we mean by “area,” “field,” “discipline,” “sub-discipline,” and “subject matter.”

On the other hand, although physics is generally considered a different domain from sociology or English literature, all three employ hypotheses that can appropriately be judged by argument-to-best-explanation criteria in NCT (Appendix A, 863). (Mark Battersby (2006) suggested “argument to the best explanation” as a more accurate label for “inference to the best explanation.”), and this makes the arguments for their hypotheses of the “same logical type,” Stephen Toulmin’s (1964, p. 14)
criterion for being the same field. John McPeek (1981, p. 32) used Toulmin’s claim that argument standards are “field dependent” to support his own subject-specificity claim. But would anyone want to say that physics, sociology, and English literature are the same field? Obviously not. It turns out that the notions of subject domain, discipline, and field are too vague and elusive to make conceptual subject-specificity a meaningful view. See Ennis (1989, 1991) for a more thorough treatment of this tricky issue.

A second problem with conceptual subject-specificity is that there really are significant general critical thinking principles. Here are some examples:

Two general principles of argument-to-the-best-explanation used by many fields are:

1. that a hypothesis should not be endorsed if there is a plausible alternative explanation, and
2. that, before a hypothesis is endorsed, a competent sincere effort should have been made (1) to find supporting and opposing data and (2) to seek alternative hypotheses.

Two general principles for judging the credibility of sources are:

3. that the credibility of a source tends to be weakened if the source has a conflict of interest, and
4. that the credibility of a source tends to be weakened if the source does not have experience in the field.

The above four principles are not subject-specific. They apply in many subjects, so no matter how one distinguishes domains, fields, subjects, and disciplines, there are significant principles that apply widely across domains and the others.

4.2. Empirical subject-specificity. Empirical subject-specificity is the view that critical thinking principles learned in one situation will as a matter of empirical fact not transfer from that situation to another type of situation (for example, to other subject areas, or to everyday life). This is an empirical factual claim, not a conceptual one. This position was advocated by Robert Glaser (1984). An expansion of it was expressed by a Review Committee of the National Academy of Education chaired by Glaser (1987), which in addition urged the development of subject-specific critical thinking tests. Though it has barely been implemented, I think that the recommendation for the development of subject-specific critical thinking tests is a good idea. But the Committee opposed general critical thinking tests. This last position does not make sense if there are significant principles that are not subject-specific, such as the four examples above, and if transfer can occur, which, based on my experience and the statements of colleagues in educational psychology, it can (personal communications from John Bransford and Ray Nickerson during the rapid development of interest in critical thinking in the 1980’s; also Diane Halpern (1998, 2014)).

Furthermore, my colleagues in educational psychology have told me that transfer can generally occur if — but only if — we teach for it. But one must be sensitive to a range of exceptions. Some students have difficulty transferring, no matter what, while some very bright students can transfer principles with little or no help.

If empirical subject-specificity were a correct position, then critical thinking principles taught in one discipline would not help us in other disciplines, nor in our daily lives. For example, the principle that I should generally take at least three readings when making an observation in a physics laboratory, which I learned in a college freshman physics course, could not be applied in my attempts to determine roughly how long it takes me to walk the one-mile circle around my neighborhood. But I do apply it — usefully. Furthermore, given empirical subject-specificity, in order to learn that principle so that I could apply it in a course in community planning, it would have to be taught in such a course; or I would have to have learned it in a community-measurement context. That seems far-fetched.

In sum, the first-year critical thinking course in the proposed Wisdom CTAC Program is not vulnerable to the subject-specificity challenge, whether interpreted conceptually or empirically.

5. Infusion vs. Immersion

In an extended consideration of the subject-specificity of critical thinking (1989), I suggested that the labels, “infusion” and “immersion,” be applied to two different approaches to embedding critical thinking in subject matter instruction. Infusion calls for making critical thinking principles, etc., explicit. In contrast, immersion avoids making principles explicit, and implies that involving, interesting, and/or heated discussion is enough for learning of critical thinking.

Infusion holds that making principles explicit helps students a great deal in their learning to think critically. Students sometimes can be the ones who make the principles explicit, perhaps at the invitation of the instructor; or, as is usually the case, the instructor makes them explicit. But the instructor must assure that the principles are clear and explicit no matter who expresses them. I advocate infusion (the approach that makes the principles explicit) — at least until it is very clear to all people present what principles are in operation. I support this explicitness in order to facilitate the transfer of critical thinking to other contexts by providing something clear to students that they can remember and apply. It is the approach I recommend for the Wisdom CTAC Program.

On the other hand, in teaching critical thinking by immersion, no effort is made by the instructor to assure that critical thinking principles are made explicit, although there can be heated discussion of issues. Although he did not call it “immersion,” it is the approach endorsed by John McPeek (1990). In my experience, the immersion approach generally fails to foster learning of
critical thinking and transfer of critical thinking to other subjects or everyday life. This view is supported by the research of Helsingogen, et al. (2010), Rosenen & Winne (1995), Nisbett (1993), and Lehman, et al. (1988), and is shared by informal logic specialist, Ralph Johnson (1996, p. 226). Of course there are exceptions and the brightest students learn and transfer under all kinds of conditions. But these results hold for most students.

6. The Impact of Critical Thinking Instruction on the Learning of Subject Matter

The incorporation of critical thinking in a higher education curriculum is sometimes regarded as a threat to subject matter instruction, either because overall it reduces the number of courses taken by students in existing fields, or because it is thought to reduce the subject matter coverage in courses in which critical thinking is embedded. These are complicated curriculum problems because they involve judgments about what is important in education and empirical judgments about what happens when students are interested in, excited by, and involved in an issue. Both of these types of judgments are complex. The broad wisdom C7/C8 position is that both subject matter and critical thinking are important.

With respect to the empirical judgments about what happens when critical thinking is infused by dealing reasonably and reflectively with issues in a particular subject, the apparent amount of subject matter coverage will probably be reduced, but even that might not be the case. If the students are excited by and involved in the issues (as they were in dealing with Newton’s First Law), they might actually spend more time and/or effort on the subject and actually cover more subject matter. Furthermore I believe that they will learn and retain more subject matter.

We are all familiar with the phenomenon of taking a large lecture course, reading most of a thick textbook, cramming for the examinations, and remembering practically none of it years later. This happened to me in an undergraduate political science course, the only content of which I remember is the idea that power is important. And even that issue, the course might not be responsible for my now knowing that power is important, its being so obvious from my following of current events over the years. If critical thinking (including the reference to principles and criteria) had been embedded in discussing, agreeing, and disagreeing about issues in that course, I believe I would have remembered more about the issues and course content and would have learned more about how to think critically in political science and elsewhere.

Of course one case, or even a few cases, are not proof. Research is needed. The three studies of which I am aware that deal with the question show no reduction of content learning, and one of them showed greater total content acquisition when critical thinking was introduced into subject matter instruction. In Tom Solon’s (2005) study in a higher education situation, retention of psychological content did not suffer when general critical thinking was infused. In S. L. M. Winocour’s (1981) and C. R. Lunken’s (1990) high school and middle school studies of reading and social studies, acquisition of subject matter did not suffer from the infusion of critical thinking instruction in Winocour’s study, and in Lunken’s study, subject matter learning was greater in the group for which critical thinking was infused.

My experience described earlier in dealing with Newton’s First Law of Motion supports the point. The reduction of subject matter coverage resulting from spending time thinking critically about an issue in the subject matter led to long-term retention of Newton’s First Law on the part of those students, and also contributed to the students’ openness to, and respect for, controlled experimentation, and perhaps even for enjoyment of education. But more research is needed on this crucial question.

In an Illinois critical thinking research project, I worked with a physics teacher, Carl Burgemeister, what was then the Niles Township High School in Skokie, Illinois. He had extensive experience infusing critical thinking in his subject matter. He asserted that the critical thinking work that he was doing with his students was helpful in their learning the subject matter, more helpful than more coverage of the textbook would have been.

These anecdotes, testimony, and the three research reports certainly do not establish the point that greater retention, or at least as much retention, of subject matter occurs when critical thinking is infused in subject matter instruction. No doubt it depends to some extent on the ratio of the amounts of time and effort, as well as the subject matter, student interests, and teacher skill. But I have at least raised a legitimate doubt about the common assumption that infusing critical thinking into subject matter instruction automatically reduces coverage and retention. More research is needed.

C. Summary

There are philosophical, institutional, conceptual, and cultural issues involved in implementing a program of critical thinking across the curriculum. What I hope to have contributed is a possible approach to critical thinking across the curriculum, the Wisdom CTAC Program, and an examination of a number of controversial issues and distinctions underlying the decisions involved in developing the proposal.

Although there are many other assumptions that have contributed to the development of this Wisdom CTAC proposal, the resolution of the following issues and distinctions seems crucial in the current academic climate. Any proposal must make and defend choices about these issues and distinctions:

1) The choice among having a separate critical
thinking course vs. the embedding of critical thinking in subject matter courses vs. doing both. The Wisdom CTAC does both.

2) The meaning of “critical thinking.” The Wisdom CTAC assumes that critical thinking is “reasonable reflective thinking focused on deciding what to believe or do”, elaborated by a detailed conception of critical thinking (NCT in Appendix A), as well as, for communicative purposes, “A Super-Streamlined Conception of Critical Thinking.”

3) The breadth of the goal of critical thinking instruction. The broad goal, critical thinking in everyday life and in specific subject matter areas is clearly important, and is assumed in the Wisdom CTAC Program.

4) The alleged subject-specificity (or “domain-specificity”) of critical thinking. When the appropriate distinctions are made, the subject-specificity position can be shown to be defective, whether it be conceptual subject-specificity or empirical subject-specificity. Thus one argument against having a separate critical thinking course is unsuccessful.

5) Infusion vs. immersion. The Wisdom CTAC Program encourages infusion, which calls for making critical thinking principles explicit during instruction.

6) The impact of critical thinking instruction on the learning of subject matter. I suspect that subject matter need not suffer, and is more likely to be retained by students in the Wisdom CTAC Program, but more research is needed. In any case, coverage is worthless if the material covered is not remembered.

Given my suggested resolution of these issues, I have developed a concrete Wisdom University proposal for teaching CTAC that could probably be implemented at any higher education institution at which there is a strong commitment to promoting critical thinking in students’ everyday lives. To summarize: Its goals are to assure a life-long grasp and practice of critical thinking in students’ everyday civic, vocational, personal, and academic lives, and a greater involvement in, and grasp of, their subjects and critical thinking therein. It commences with a required two-semester freshman critical thinking course covering general basic critical thinking dispositions and abilities as well as some general and/or subject-specific critical thinking in six subject fields chosen by the faculty from six different areas. Subsequently an intensive effort is made within each subject department to infuse general, as well as less general, critical thinking principles and criteria in its offerings accompanied by students’ transferring them to their everyday lives, where appropriate.

Extensive coordination among various elements of the University will be needed, including a common glossary of critical thinking terms, a common conception of critical thinking, a steering committee, a CTAC office with a director and a number of teachers and consultants with joint appointments, and a series of internal discussions about the meaning, application, teaching, and assessing of critical thinking principles and criteria. Assessment will be a continuing significant coordinated and situation-specific concern.

A senior project will be expected of each student in his or her field, supervised by staff of that field, with help from a critical thinking consultant from the University’s CTAC Office, if needed. Each student’s written report will state and defend its theme or thesis and provide an exemplified list of the critical thinking dispositions and abilities employed by the student.

Teaching strategies and tactics will emphasize interaction and involvement, numerous varied examples, attention to transfer, and explicitness of critical thinking dispositions and principles. Familiarity with basic general principles and criteria will be assured by the first-year course.

This proposal for a Wisdom CTAC Program will not be easy to implement, I must admit. Changes are always difficult. But I certainly hope that one goal that any institution will emphasize, whether or not it accepts the total proposal, is the application of critical thinking to our everyday lives. When seen from a life-long perspective, the value of teaching critical thinking in our educational system cannot be overestimated.

References


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Appendix A: The Nature of Critical Thinking:
Outlines of Critical Thinking
Dispositions and Abilities
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Critical thinking is “reasonable reflective thinking focused on deciding what to believe or do.” This definition (or concept) of critical thinking I believe captures the core of the way the term is ordinarily used by supporters of critical thinking. In deciding what to believe or do, one is helped by the employment of a set of critical thinking dispositions and abilities (which is a conception of critical thinking) that I outline in detail below. This conception of critical thinking can serve as a set of comprehensive goals for a critical thinking curriculum and its assessment, and could be used as a syllabus for a course or a curriculum in critical thinking. For interactive teaching suggestions that would make such a syllabus more engaging, see Appendix B, “Twenty-One Strategies and Tactics for Teaching Critical Thinking”.

Usefulness in curriculum decisions, teaching, and assessment, not elegance or mutual exclusiveness, is the purpose of this outline. For the sake of brevity, clarification in the form of examples, qualifications, and more detail, including more criteria, are omitted, but can be found in sources listed below, including “Critical Thinking: A Streamlined conception” (1991b) and “A Taxonomy of Critical Thinking Dispositions and Abilities” (1987a), but more fully in Critical Thinking (1996a). See Note 1.

Although the word “critical” in the English language is sometimes used in a negative sense, the concept of critical thinking presented here is not negative. To my knowledge, no participants in the critical thinking movement endorse a negative notion. Furthermore the concept of critical thinking presented here does not define critical thought as persuasion, but critical thought will, let us hope, be more persuasive than uncritical thought. The future of democracy depends on it.

These outlines of dispositions and abilities are the evolved encapsulation of many years of work in the elaboration of the simple definition (the concept) of “critical thinking” given above. This elaboration resulted from consultation with classical and current authorities on good thinking, and from repeatedly asking the question, “How do people go wrong in their thinking?” Pursuing this question was not circular because there is much that we know from experience, if we just think about it.

A recent addition to abilities is attention to graphs & maths, including a few concepts in elementary statistics. The need to include graphs & maths (Ability #4) is evident to anyone familiar with current discussion and citation of studies of public issues.

CRITICAL THINKING DISPOSITIONS

Ideal critical thinkers are disposed to

1. Seek and offer clear statements of the thesis or question
2. Seek and offer clear reasons
3. Try to be well informed
4. Use credible sources and observations, and mention them
5. Take into account the total situation
6. Keep in mind the original or most basic concern in the context
7. Be alert for alternatives
8. Be open-minded
   a. Seriously consider points of view other than their own
   b. Reason from starting points with which they disagree
      without letting the disagreement interfere with their reasoning
   c. Withhold judgment when the evidence and reasons are insufficient
9. Be aware of their own thinking and deeply-held beliefs
10. Take a position and change a position when the evidence
    and reasons are sufficient to do so
11. Seek as much precision as the subject permits
12. Deal in an orderly manner with the parts of a complex whole
13. Employ their critical thinking abilities and dispositions
14. Be sensitive to the feelings, level of knowledge, and degree of sophistication of others
15. Try to “get it right,” including seeking the truth if the concept of truth is appropriate.

(See Note 2.)

CRITICAL THINKING ABILITIES

A summary outline is presented first, followed by a detailed outline that includes criteria and details, is difficult reading when read straight through, and should
be consulted when in search of details and criteria. At appropriate points in the detailed outline one will find some references to prior work that provides enlightening discussion and a number of principles and criteria, especially for the more advanced topics (e.g., argument to best explanation, ascribing assumptions, definition).

Summary outline of abilities:

Ideal critical thinkers have the ability to:
1. Focus on a question
2. Analyze arguments
3. Ask and answer clarification questions
4. Read and use “graphs & maths”
5. Judge the credibility of a source
6. Observe, and judge observation reports
7. Deduce, and judge deductions
8. Make and judge material inferences
   (a) Enumerative induction
   (b) Argument to best explanation
9. Make and judge value judgments
10. Define terms and judge definitions
11. Handle equivocation
12. Attribute unstated assumptions and judge such attributions
13. Think suppositionally
14. Integrate one’s dispositions and abilities
15. Proceed in an orderly manner, appropriate to the situation
16. Employ, recognize, and appropriately react to rhetorical strategies and “fallacy” labels.

Detailed outline of abilities:

The abilities numbered 1 to 4 involve basic clarification; 5 and 6, the bases for a decision; 7 to 9, inference; 10, 11, and 12, advanced clarification; and 13 and 14, supposition and integration. Abilities 15 and 16 facilitate the other abilities. Citations are to sources of extended elaboration.

(Basic Clarification, 1 to 4)
1. Focus on a question:
   a. Identify or formulate a question
   b. Identify or formulate criteria for judging possible answers
   c. Keep the question and situation in mind

2. Analyze arguments:
   a. Identify conclusions
   b. Identify reasons or premises
   c. Identify simple assumptions (see also Ability #12)
   d. Identify and handle irrelevance
   e. Determine the structure of an argument, possibly with a diagram
   f. Summarize

3. Ask and answer clarification questions, such as:
   a. Why?
   b. What is your main point?
   c. What do you mean by...?
   d. What would be an example?
   e. What would not be an example (though close to being one)?
   f. How does that apply to this case (describe a case, which appears to be a counterexample)?
   g. What difference does it make?
   h. What are the facts?
   i. Is this what you are saying:__________?
   j. Would you say more about that?

4. Read and use “graphs & maths”:
   a. Read graphs, scatterplots, tables, bar charts, etc.
   b. Do and understand arithmetic and other elementary mathematics, such as percentages
   c. Understand the concepts of correlation, standard deviation, and statistical significance
      (1) Correlation: the degree to which two variable vary together
      (2) Standard deviation: very roughly, the amount of variation in a group of numbers
      (3) Statistical significance: Commonly a difference between mean scores is judged statistically significant if a certain amount of difference could not have happened by chance more than at a chosen level. Often one time out of a hundred is the chosen level, but five times out of a hundred is sometimes chosen. The latter is easier to attain.

(Bases for a Decision: 5 and 6)
5. Judge the credibility of a source (Ennis, 1974a). Major criteria (but not necessary conditions):
   a. Expertise
   b. Lack of conflict of interest
   c. Agreement with other sources
   d. Reputation
   e. Use of established procedures
   f. Known risk to reputation (i.e., the source’s knowing of a risk to reputation, if wrong)
   g. Ability to give reasons
   h. Careful habits

6. Observe, and judge observation reports. Major criteria (but not necessary conditions, except for the first) include these:
   a. Minimal inferring involved
   b. Short time interval between the observation and the report
   c. Report by the observer, rather than someone else (that is, the report is hearsay); crucial in the courts
   d. Provision of records
   e. Corroboration
f. Possibility of corroboration  
g. Good access  
h. Competent employment of technology, if technology applies  
i. Satisfaction by observer (and reporter, if a different person) of the credibility criteria in Ability #5 above  

(Note: Another basis for your decision is of course your own previously established conclusions.)

(Inference, 7 to 9)
a. Class logic  
b. Conditional logic  
c. Interpretation of logical terminology, including  
   (1) Negation and double negation  
   (2) Necessary and sufficient condition language  
   (3) Such words as "only," "if and only if," "or," "some," "unless," and "not both."  
d. Qualitative deductive reasoning (a loosening for practical purposes), (Ennis, 2004, 2006, 2007)

8. Make and judge material inferences (induction):  
a. To generalizations (enumerative induction). Broad considerations:  
   (1) Typicality of data, including valid sampling where appropriate  
   (2) Volume of instances  
   (3) Conformity of instances to the generalization  
   (4) Having a principled way of dealing with outliers  
b. To explanatory hypotheses and conclusions:  
   (This is IBE ("inference-to-best-explanation"), sometimes more accurately described as "argument to best explanation" (Battersby, 2006)), (Harman, 1965, 1968; Ennis, 1968, 1982a, 1983b, 1996a; Mackie, 1974; Lipton, 2004)  
   (1) Major types of explanatory conclusions and hypotheses, showing how broadly this type of inference applies:  
      (a) Specific and general causal claims  
      (b) Claims about the beliefs and attitudes of people  
      (c) Interpretation of intended meanings  
      (d) Historical claims that certain things happened (including criminal accusations)  
      (e) Reported definitions  
      (f) Claims that some proposition is an unstated, but used, reason (Ability #1b3)  
   (2) Characteristic investigative activities:  
      (a) Designing and doing investigative activities, including planning to control variables  
      (b) Seeking evidence and counterevidence, including statistical significance, correlations, mean differences, and standard deviations  
      (c) Seeking other possible explanations  
   (3) Rough criteria, application of which requires judgment. The first four are essential, the fifth desirable:  
      (a) The proposed conclusion would explain or help explain the evidence  
      (b) The proposed conclusion is consistent with all known facts  
      (c) Competitive alternative explanations are inconsistent with facts  
      (d) A competent sincere effort has been made to find supporting and opposing data, and alternative hypotheses  
      (e) The proposed conclusion seems plausible and simple, fitting into the broader picture

9. Make and judge value judgments, taking into account:  
a. Background facts  
b. Consequences of accepting or rejecting the judgment  
c. Prima facie application of acceptable principles  
d. Alternatives  
   e. The need to balance, weigh, decide

(Advanced Clarification, 10 through 12)
10. Define terms and judge definitions, using appropriate criteria  
    (Four basic dimensions: form, stance, content, and use)  
    a. Definition form. For discussion of Forms 1 through 4 and 6, see Ennis (1996a, Ch 12 & 13). For #5 see Ennis (1964 or 1969b). For all (in science), see Ennis (1974b)  
       (1) Synonym form (one word = another word)  
       (2) Classification form (genus-differentia), (items properly labeled by a term (a noun) are members of a class and are differentiated from other members of the class)  
       (3) Range form (like classification, but with imprecise boundaries)  
       (4) Equivalent-expression form (term being defined is embedded in a larger expression, which is equated with another expression)  
       (5) Operational form (like equivalent-expression, but the second expression describes an operation and a consequent observation; can be strict (as in behaviorism) or loose), (Ennis, 1964, 1969b)  
       (6) Example and non-example form (non-examples sometimes being particularly informative)  
    b. Definitional stances (report, stipulate, express a position):  
       (1) Report a meaning (criteria: the five criteria for an explanatory hypothesis in Ability #8d3)  
       (2) Stipulate a meaning (criteria: convenience, consistency, avoidance of equivocation)  
       (3) Express a position on an issue (positional definitions, including "programmatic" and "persuasive" definitions), (criteria: all dispositions and abilities, (Ennis, 1996a, 2001)  
       c. Content of the definition  
       d. Uses of a definition:  

11. Handle equivocation (the exploitation of a shift in meaning), both when deliberate and when not deliberate (the latter being called "impact equivocation") (having the impact of equivocation))

12. Attribute unstated assumptions, and judge such attributions (an ability that exemplifies both basic clarification and inference:
   a. Pejorative flavor (implication of dubiuousness or falsity); commonly but not always associated to some degree with the other types of assumptions; criteria are to be found in Abilities #5 through #9 above
   b. Types:
      (1) Presuppositions (required for a proposition to make sense, or to be true or false)
      (2) Needed assumptions (needed by the reasoning to be at its strongest (though not logically necessary); see inferences (Abilities 7-9 above), (Ennis, 1961, 1982c, 2001); (called "assumptions of the argument" by Hitchcock (1985)
      (3) Used assumptions (judged by hypothesis-testing criteria (Ability #8b3); Ennis (1982c); called "assumptions of the arguer" by Hitchcock (1985)

(Supposition and Integration, 13 and 14)

13. Think suppositionally: Consider and reason from premises, reasons, assumptions, positions, and other propositions with which one disagrees or about which one is in doubt, without letting the disagreement or doubt interfere with one's thinking

14. Integrate one's dispositions and abilities in making and defending a decision about what to believe or do

(Facilitative abilities, 15 and 16)

15. Proceed in an orderly manner appropriate to the situation:
   a. Follow problem solving steps
   b. Monitor one's own thinking (that is, engage in metacognition)
   c. Employ a reasonable critical thinking checklist

16. Employ, recognize, and appropriately react to rhetorical strategies and "fallacy labels" in discussion and presentation whether oral or written). Examples of fallacy labels are "circularity," "bandwagon," "post hoc," "equivocation," "non sequitur," and "straw person." Criteria for judgments underlying the appropriate use of fallacy labels appear in Abilities 1-14 above.

SUMMARY AND COMMENTS

In brief, the ideal critical thinker is disposed to try to grasp a position clearly, to "get it right," to find the truth if it is to be found, and to present a position honestly and clearly; the ideal critical thinker has the ability to clarify, to seek and judge well the basis for a view, to infer wisely from the basis, to suppose and integrate imaginatively, and to do these things with sensitivity and skill.

Space limitations have precluded exemplifying here these principles and criteria, and their application in real-life situations, though I have done so elsewhere (1987a, 1991b, and 1996a).

A broad integrative personal reflection with perspective on these items can be found in Ennis (2011a), and with application to teaching and assessment in 2011b.

References

Note: For convenience, a separate set of references is provided for Appendix A, resulting in some duplication with, and inclusion of some items that are not in, the Main Reference List.


Harman, Gilbert H. (1965). The inference to best explanation. The Philosophical Review,


Notes


2. Organization and exact wording of critical thinking dispositions has been modified over the years in the direction of theoretical refinement and precision (Norris & Ennis, 1989; Ennis, 1987a, 1991a, 1996a, 1996b, and 2011a). But the presentation here is a return almost to the original, because it is simpler and more amenable to use in teaching.

3. The mention of truth in Disposition #15 calls for descriptions of types of constructivism. Radical epistemological constructivism holds that all supposed truths are constructed by us. Conservative epistemological constructivism is the view assumed in this definition/conception of critical thinking holds that our concepts and terms are constructed by us, but also that (to oversimplify somewhat) the relationships among the referents of our concepts and terms are not constructed by us. We can have true or false beliefs about these. For example it is true that Chicago is north of Miami, though our concept of North, and the referring by the words “Chicago” and “Miami” are decided (constructed) by human beings.

Pedagogical constructivism holds that students learn best when they construct their own answers to problems and questions: For some (but not all) goals and types of learning, this view has empirical support, but it should not be confused with either type of epistemological constructivism. In particular, the validity of pedagogical constructivism (to the extent that it is valid) does not imply the validity of either type of epistemological constructivism. Pedagogical and epistemological constructivism are totally different ideas, though they are sometimes conflated.

There is a vast literature about “true,” “truth,” and constructivism. The view here assumed is that we all use the words “true” and “truth” regularly in our daily lives, and that these words should be understood here in the same way we use and understand them in our daily lives.

4. “Auxiliary” abilities are those that are not constitutive of critical thinking, but helpful in doing it.

5. The most recent version of the critical thinking abilities and dispositions outlines in Appendix A is Ennis (2013a). An earlier version is in Ennis (2011a). The most recent source of the teaching suggestions in Appendix B is Ennis (2013b). An earlier version is in Ennis (2011b).

Appendix B. Twenty-One Strategies and Tactics for Teaching Critical Thinking

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The actual teaching of critical thinking is a function of many situation-specific factors: teacher style, teacher interest, teacher knowledge and understanding, class size, cultural and community backgrounds and expectations, student expectations and backgrounds, colleagues’ expectations, recent local events, the amount of time available to teachers after they have done all the other things they have to do, and teacher grasp of critical thinking, to name some major factors. I here suggest some general strategies and tactics gleaned from years of experience, research, and others’ suggestions. They are guidelines and must be adjusted to fit the actual situation.

Underlying Strategies

(The three underlying strategies are “Reflection, Reasons, Alternatives” (RRA):

1. Urge students to be Reflective, to stop and think, instead of making snap judgments, or accepting the first idea that comes into their heads, or automatically accepting whatever is presented in the media.

2. Gently ask such questions as “How do you know,” “What are the reasons?” and “Is that a good source of information?” thus prodding them to have good Reasons for their views and to seek reasons for others’ views.

3. Emphasize alertness for Alternative hypotheses, conclusions, explanations, sources of evidence, points of
view, plans, etc.

Fundamental Strategies

4. Use a defensible conception of critical thinking with which you feel comfortable.

5. Provide for many guided opportunities in varied contexts for students to practice critical thinking in application of critical thinking principles to examples, including a number of opportunities in realistic situations that they see as significant.

6. More specifically, where transfer is desired, teach for the transfer of critical thinking principles to everyday life and to other subjects by giving much practice with examples, some of which call for transfer. Call students' attention to how the critical thinking principles and criteria apply in a transfer situation, and if feasible, arrange for students to practice transfer applications.

7. Sometimes ask the question, “Why?”, when you agree with your students, as well as when you don’t -- and when you are unsure yourself -- or are trying to find out what they mean. “Why?” is sometimes threatening, but is the most concise way to draw out the reasons. A less aggressive question is, “Would you say a little more about that?”

8. Emphasize their seeing things from others’ points of view and being open minded – including being willing to reconsider, if other reasons and evidence arise.

9. Assess what is important in critical thinking using tests or other assessment procedures that are sufficiently valid and reliable in the situation; except for special circumstances, incorporate the results in the course grade and/or any other report that matters to the students; and discreetly make sure that students are aware of this incorporation. Lastly, make sure that the assessment procedure fits the critical thinking instruction; this often requires thinking about assessment well in advance of its use.

10. Students do not need to become subject-matter experts before they can start to learn to think critically in a subject. These things can proceed together, each helping the learning of the other. Students will remember best the subject matter they use (e.g., in making decisions). But ultimately, of course, being well informed and familiar with the topic and the situation calling for critical thinking are essential for critical thinking.

11. In a subject-matter course, the time required for infusion of critical thinking is often justified, not only for the critical thinking learned, but also for an enhanced deeper understanding of the subject. (Consider how much you have retained of the subject matter to which you were exposed as a student in lecture courses compared with seminars calling for reflective participation.)

12. “Infusion” here refers to the embedding of critical thinking in subject-matter instruction that ensures that the principles of, and criteria for, critical thinking are explicit, whether stated by students or the teacher. “Immersions” refers to the embedding in which critical thinking principles are not made explicit by anybody. Of course some cases lie in between. Infusion in subject-matter instruction is more likely to succeed than immersion because knowing principles promotes learning, whether it be learning to think critically in the subject (in subject-specific instruction), or transferring critical thinking learning to other subjects or everyday life.

Tactics

13. Sometimes ask students to address questions to which you do not know the answer, or that are controversial, The question should seem significant to them and be interesting.

14. Give them time to think about questions and situations. If you wait long enough, someone will offer an answer. In other words, provide “wait time.”

15. In a discussion, label a student’s statement (or thought, answer, hypothesis, position, point, objection, question, etc.) with the student’s name, so that the student receives attention and assumes some responsibility. Write the statement on the board, or screen. (Do not worry that you might be wasting time doing this. It gives students a chance to think about the statement or thought.) Invite them to help formulate what you write. Encourage them to speak to each other’s positions, giving reasons. Provide wait time.

16. Have them write down their positions, giving reasons to support what they think, showing awareness of opposing positions and the weaknesses of their own positions. Limit the length to a few sentences, one page, or two or three pages, etc., depending on their maturity and the time available.

17. Provide a set of criteria for judging papers, reports, letters, proposals, or sentences in which they take positions. The criteria should reflect the critical thinking principles that you have been telling them are important.

18. Have them read each other’s written statements.
or position papers, applying these criteria and making suggestions. Then get them to revise -- and revise again, in the light of still other comments or further thought.

19. Have them work on issues or questions in groups, with each group reporting to the entire class, and each person showing the others what he or she has done. Students are eager to do well in the eyes of their peers (just like the rest of us).

20. Be ready to postpone an assignment, if the content of the previous assignment is not understood. Understanding, not coverage, is the goal.

**Mid-level Strategies**

21. To supplement the underlying strategies, “RRA,” urge mid-level students to use the following acronyms and their associated guidelines: “FRISCO” and “SEBKUS.”

**FRISCO:** When appraising a position, whether yours or another’s, attend at least to these elements:

F for Focus: Identify or be clear about the main point, that is, the conclusion
R for Reasons: Identify and evaluate the reasons
I for Inference: Consider whether the reasons establish the conclusion, given the alternatives
S for Situation: Pay attention to the situation
C for Clarity: Make sure that the meanings are clear
O for Overview: Review your entire appraisal as a unit

**SEBKUS:** When doing appraisals and planning investigations and other actions, make full use of and try to expand your Sensitivity, Experience, Background Knowledge, and Understanding of the Situation. Critical thinking does not occur in a vacuum.

**Overview**

These strategies and tactics, as presented, are empty slogans and formulas unless thoughtfully implemented. In following any one, consider in advance what might happen, and how you might deal with it. Practice formulating involving questions like “How many agree?” “Why?” “Who thinks otherwise?” “Why?” “How can we settle this?” “What does this evidence tell us?” “Are there any alternatives?” “Can someone tell me what was going on?” “Write a short answer and exchange with your neighbor.” “Together decide on an appropriate answer.” “Present it to your local group.” “Select the one that the group likes best and read it to us.” “Were they thinking critically?” “Why?”

Be patient, but show that you are interested in their thoughts. Think about it afterwards, and consider what you would have done differently using SEBKUS.

Note: An earlier version of these suggestions is in Ennis (2011b, pp. 14-15). The current version is under “How Can Critical Thinking Be Taught?” in http://criticalthinking.net