

Critical Thinking at Calvin College

A report of the Critical Thinking Task Force
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Introduction

If critical thinking is as hard to teach as it is to define, we are all in a lot of trouble. There may be some hope for us, though, in a comment by John Netland: “Critical thinking is a lot like jazz. We may not be able to define it, but we can recognize it when we hear it.” In that spirit, this report will:

- present some widely referenced definitions of critical thinking (CT),
- summarize and evaluate them,
- present an operational definition of CT in the form of a grading rubric,
- discuss where CT is currently being taught in our core curriculum,
- present and discuss some data on CT at Calvin College collected in the spring term of 2007, and
- conclude with some recommendations on how we can strengthen the teaching of CT at Calvin.

Definitions of critical thinking

From 1988-90, the American Philosophical Association undertook a study of CT known as the Delphi Project [Facione]. A team of 46 experts on CT developed a consensus statement on the nature of CT and made 15 recommendations on its teaching. The Delphi conceptualization of CT consists of 6 skills, each of which is broken down into sub-skills. (Table 1) We’ve added a(n) (over)simplified explanation for each of their terms.

Skill	Sub-skill	Meaning
<i>1. Interpretation</i>	<i>Categorization</i>	<i>Understanding the meaning of information or situations relative to their context</i>
	<i>Decoding significance</i>	<i>Understanding the informational content of communications</i>
	<i>Clarifying meaning</i>	<i>Explaining or paraphrasing words or ideas</i>
<i>2. Analysis</i>	<i>Examining ideas</i>	<i>Determining the role expressions play in an argument, defining terms</i>
	<i>Identifying arguments</i>	<i>Recognizing that a piece of text is an argument</i>
	<i>Analyzing arguments</i>	<i>Identifying premises, conclusions, expressed and unexpressed reasons, and the structure of the argument</i>
<i>3. Evaluation</i>	<i>Assessing claims</i>	<i>Assessing credibility of an argument or source of information</i>
	<i>Assessing arguments</i>	<i>Evaluating the structure of an argument</i>

4. Inference	<i>Querying evidence</i>	<i>Recognizing the kinds of evidence needed to develop an argument</i>
	<i>Conjecturing alternatives</i>	<i>Developing sets of options for actions, theories, priorities, etc.</i>
	<i>Drawing conclusions</i>	<i>Applying appropriate modes of inference to form a conclusion</i>
5. Explanation	<i>Stating results</i>	<i>Communicating the results of one's reasoning</i>
	<i>Justifying procedures</i>	<i>Convincingly presenting the methodology one used in reaching conclusions</i>
	<i>Presenting arguments</i>	<i>Giving reasons for accepting a claim</i>
6. Self-regulation	<i>Self-examination</i>	<i>Reflecting on one's own reasoning and making a meta-cognitive assessment of it</i>
	<i>Self-correction</i>	<i>Designing reasonable procedures to remedy or correct one's mistakes and their causes</i>

It also consists of a list of affective dispositions of CT (Table 2). The Delphi experts reached consensus on the skills, but were divided on the affective dimension. 61% of them regarded the dispositions as properly part of the concept of CT although the rest did not. However, 83% agreed that the dispositions characterize good critical thinkers.

Table 2	
Affective dispositions of critical thinking	
<i>Approaches to life and living in general</i>	
<i>Inquisitiveness with regard to a wide range of issues</i>	
<i>Concern to become and remain generally well-informed</i>	
<i>Alertness to opportunities to use CT</i>	
<i>Trust in the processes of reasoned inquiry</i>	
<i>Self-confidence in one's own ability to reason</i>	
<i>Open-mindedness regarding divergent world views</i>	
<i>Flexibility in considering alternatives and opinions</i>	
<i>Understanding of the opinions of other people</i>	
<i>Fair-mindedness in appraising reasoning</i>	
<i>Honesty in facing one's own biases, prejudices, stereotypes, egocentric, or sociocentric tendencies</i>	
<i>Prudence in suspending, making or altering judgments</i>	
<i>Willingness to reconsider and revise views where honest reflection suggests that change is warranted</i>	
<i>Approaches to specific issues, questions, or problems</i>	
<i>Clarity in stating the questions or concern</i>	

<i>Orderliness in working with complexity</i>
<i>Diligence in seeking relevant information</i>
<i>Reasonableness in selecting and applying criteria</i>
<i>Care in focusing attention on the concern at hand</i>
<i>Persistence though difficulties are encountered</i>
<i>Precision to the degree permitted by the subject and the circumstance</i>

The National Council for Excellence in Critical Thinking Instruction took a less taxonomic approach. Here are two excerpts from their statement [Scriven]:

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

Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem solving abilities and a commitment to overcome our native egocentrism and sociocentrism.

Lastly, here's a collection of web definitions of CT:

...is a term used to refer to those kinds of mental activity that are clear, precise, and purposeful. It is typically associated with solving complex real world problems, generating multiple (or creative) solutions to a problem, drawing inferences, synthesizing and integrating information, distinguishing between fact and opinion, or estimating potential outcomes, but it can also refer to the process of evaluating the quality of one's own thinking.

...

www.senate.psu.edu/curriculum_resources/guide/glossary.html

An ability to evaluate information and opinions in a systematic, purposeful, efficient manner.

highered.mcgraw-hill.com/sites/0070294267/student_view0/glossary_a-d.html

An essential tool of inquiry; purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. ...

www.netnet.org/students/student%20glossary.htm

A cognitive process based on reflective thought and a tolerance for ambiguity...

web.uccs.edu/bethelstudenthandbook/definition_of_curriculum_terms.htm

Reasonable reflective thinking that is focused on deciding what to believe or do. More precisely, it is assessing the authenticity, accuracy, and/or worth of knowledge claims and arguments. It requires careful, precise, persistent and objective analysis of any knowledge claim or belief to judge its validity and/or worth.

www.seattlecentral.org/faculty/jshoop/glossary.html

is the process of evaluating propositions or hypotheses and making judgments about them on the basis of well-supported evidence. (see Thinking Critically About Psychology)

Example: Consider the five steps of critical thinking. (a) What am I being asked to believe or accept? What is the hypothesis? (b) What evidence is available to support the assertion? Is it reliable and valid? (c) Are there alternative ways of interpreting the evidence? (d) What additional evidence would help to evaluate the alternatives? (e) What conclusions are most reasonable based on the evidence and the number of alternative explanations?

www.college.hmco.com/psychology/bernstein/psychology/6e/students/key_terms/ch02.html

Focused, organized thinking about such things as the logical relationships among ideas, the soundness of evidence, and the differences between fact and opinion.

highered.mcgraw-hill.com/sites/007256296x/student_view0/glossary.html

A persistent effort to examine evidence that supports any belief, solution, or conclusion prior to its acceptance. The ability to think clearly, to analyze, and to reason logically.

www.misd.net/gifted/terms.htm

Shows or requires careful analysis before judgment.

www.ncpublicschools.org/curriculum/artsed/scos/visualarts/vglossary

Systematic and analytic reasoning; includes convergent and logical thinking and the high levels of Bloom's taxonomy.

www.district196.org/elp/educationalterms.htm

Cultivated analytical skills allowing students to logically comprehend and solve complex concepts or problems.

pages.mhlearningnetwork.com/jdelisle/id25.html

A complex set of cognitive skills employed in problem-solving and intellectual consideration and innovation. ...

www.trincoll.edu/~tvogel/gloss.htm

Critical thinking is a process that challenges an individual to use reflective, reasonable, rational thinking to gather, interpret and evaluate information in order to derive a judgment. The process involves thinking beyond a single solution for a problem and focusing on deciding what the best alternatives are.

www.ptc.edu/department_nursing/Philosophy.htm

one of the most important skills for college work and beyond, seeks the meaning beneath the surface of a statement, poem, editorial, picture, advertisement, or other "text." Using

analysis, the critical thinker separates this text into its elements in order to see meanings, relations, and assumptions that might otherwise remain buried.

members.tripod.com/hjohnsonmac0/TermsToKnow.htm

Summarized from a variety of composition theorists from Key Terms in Composition Studies; includes seeing facts stripped down and vulnerable, similar to reflective thinking that invites speculation and questioning, or as John Trimbur defines: (elicits) counter-reading of the codes and practices of the dominant culture (50-51).

english.montclair.edu/isaacs/605LitResearch/litermFA02.htm

The careful and deliberate determination of whether to accept, reject, or suspend judgment about a claim.

www.mhhe.com/mayfieldpub/ct/ch01/glossary.htm

Critical thinking is the rational and reflective process of making judgments. This process underlies independent and interdependent nursing decisions and provides the basis for reflective nursing practice. Critical thinking includes the ability to manage ambiguity as part of the complexity of human experience and roles.

k.faculty.umkc.edu/kinnamanm/CompDef.htm

is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information, gathered or generated by observation, experience, reflection, reasoning, and/or communication as a guide to belief or action. ...

www.delmar.edu/rn/handbook/docs/glossary.html

Critical thinking is a mental process of analyzing or evaluating information. Such information may be gathered from observation, experience, reasoning, or communication. Critical thinking has its basis in intellectual values that go beyond subject matter divisions and include: clarity, accuracy, precision, evidence, thoroughness and fairness.

en.wikipedia.org/wiki/Critical_thinking

Dimensions of CT

The graphic below illustrates the relationships among various dimensions of CT.

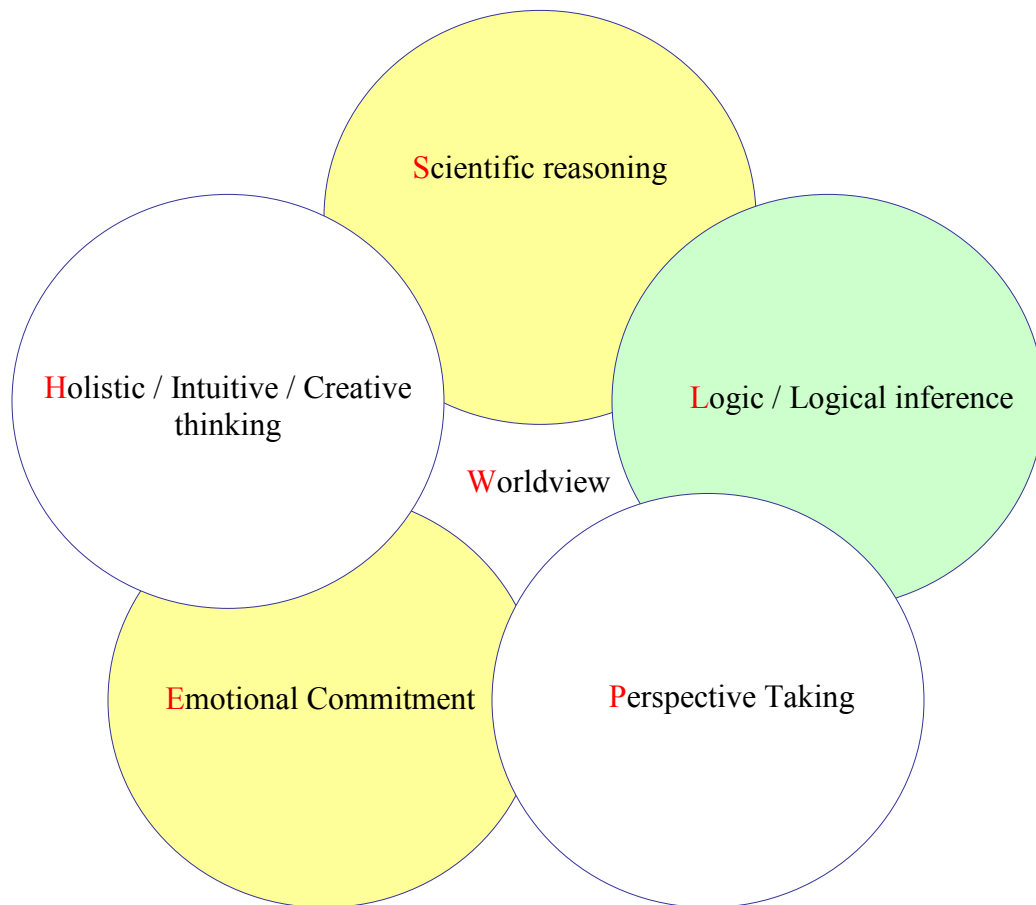
Here's an explanation of our terminology:

- **Worldview** is demonstrated when the student can articulate a coherent set of personally held presuppositions and their relevance to the issues under investigation. They should also be able to show a well thought-out basis for their perspectives and be able to apply perspectives in meaningful and dynamic ways. Finally, they should be able recognize when worldviews are operating in the positions of others, how worldviews are distinct from evidence, and how worldviews can color (for better or worse) conclusions about evidence.
- **Emotional commitment** involves showing passion for the issues, positions and perspectives. The student also shows a level of personal commitment to ideas that is based on careful

consideration and weighing of alternatives and shows enough flexibility to remain open to new ideas.

- **Perspective taking** involves engaging in diverse perspectives and demonstrates clear understanding of others' ideas and the structure of their thinking. The student is able to show respect and charity to the ideas of others and can recognize ambiguity and complexity in discourse. They also recognize how their own worldview (correct or not) may bias observations and conclusions. This dimension is both cognitive, involving the ability to mentally change perspectives, and emotional/attitudinal since it involves a level of respect for others.

Dimensions of Critical Thinking



- **Holistic, intuitive and creative thinking** is demonstrated when the student is able to see the larger picture and/or the greater context for the issue. They are also able to use creative thinking to come to unique solutions, understand broader implications of solutions and show awareness of their own thinking process and the thinking process of others. Finally they are able to find deeper meaning in issues and images they experience.

- Logical inference is demonstrated when the student shows clear structure to their own thinking and the thesis follows reasonably (logically) from well established ideas / evidence. They can also infer coherent and logically warranted conclusions.
- Scientific reasoning is demonstrated when students can articulate a clearly testable hypothesis that draws from existing knowledge and evidence. They should also be able to distinguish between correlational and cause-effect relationships and demonstrate a clear appreciation for the essentials of proper scientific methods (sampling, measurement, reliability, internal and external validity, statistical inference).

As for the dynamics and interrelationships of the dimensions,

- For aesthetic reasons the circles do not overlap with all other circles. However, in some respects each dimension intersects with all other dimensions in some respects. This implies an inherent redundancy and overlap with each dimension, yet each dimension has features that are unique to specific situations.
- While all dimensions interrelate, they can be evaluated separately for any specific activity, assignment or assessment outcome. So if the activity does not stress one dimension, it would certainly be appropriate to eliminate one of the dimensions from each of the 5 critical thinking stages. For example, having a student evaluate a work of art might focus on all dimensions except for logical inference and scientific thinking; an assignment to critique a piece of social science research might entail all dimensions except holistic thinking and emotional commitment. Another possibility is to eliminate one or more of the dimensions from only some of the critical thinking stages, leaving them intact in others.
- While worldview is central in the diagram, and in many ways central to life, it does not necessarily have to be central to a particular exercise, outcome or assessment activity.
- One additional criterion for evaluating student critical thinking is to assess the degree to which the student shows balance in these dimensions. A liberal arts education should provide skills and attitudes that balance rational thinking with perspective taking and worldview sensitivity; emotional commitment and holistic thinking with scientific reasoning.

Summary and response

So what are we to make of all this information? None of the definitions examined earlier incorporates all of the aspects of CT. The Delphi definition, for example, seems to focus on arguments. Its main features are understanding words and symbols, understanding the structure of arguments, evaluating arguments, formulating arguments, communicating, and engaging in constructive self-critique. But it does not address other forms of critical thinking. One obvious omission is that it discusses understanding information and evaluating arguments, but not evaluating information. It also doesn't seem to allow for critical reading of a text to draw out its non-superficial meaning or analysis of a piece of music or artistic work in order to understand how it achieves a particular effect.

The Delphi list of affective dispositions of CT seems consistent with the values emphasized in several other definitions. But all the definitions seem to steer clear of passionate engagement apparently preferring an ideal closer to the Enlightenment's disinterested observer. Also, none seem to acknowledge that making observations and understanding meaning cannot be done from

the position of a neutral observer but are shaped by one's experiences, culture, and worldview although some begin to suggest this perspective with the inclusion of self-reflection. And while most focus on mental activity, few mention that CT is purposeful and aims toward belief or action.

At Calvin, we have focused on cultural discernment and understanding the influence of worldviews as a mode of critical thinking. Some have described this as Calvin's "signature pedagogy." Only one of the definitions is explicit about this – the one that uses the phrase "counter-reading of the codes and practices of the dominant culture." However, several suggest it through notions such as identifying assumptions and presuppositions and evaluating the validity of interpretations.

Defining CT at Calvin

We could write our own definition of CT along the lines of the Delphi Report or one of the other definitions. But CT is subtle and complex and every definition seems to omit something. Also it's not clear that such a statement would serve us in a useful way. Rather it seems to us that it would be more helpful to formulate our concept of CT as a grading rubric – one that does not attempt to capture every feature of CT but identifies a number of key indicators of CT that we regard as especially important. The rubric can be given to students to help them understand what we mean by CT and can be adapted by instructors for grading various assignments, thereby giving students a strong incentive to engage in CT. In essence, the rubric can serve as an operational definition of CT at Calvin.

The following rubric is adapted from one developed at Washington State University. [WSU]

The Critical Thinking Stages Rubric

←Rating scale→

1

2

3

4

5

Identifying the Issue: [W = Worldview, E = Emotional commitment, P = Perspective taking, H = Holistic, intuitive and creative thinking, L = Logical inference, S = Scientific reasoning]

<i>Limited</i>	<i>Emerging</i>	<i>Advanced</i>
<p>W – Does not state any worldview or shows no meaningful connection to their worldview</p> <p>E – No apparent passion or energy for the issues</p> <p>P – No awareness of the broader contexts or the implicit views that impact the issue.</p> <p>H – No awareness of the larger picture; unable to find significance or deeper meaning in the situation.</p> <p>S/L – Cannot clearly identify or define the specific issues</p>	<p>W – Presuppositions are stated in vague terms or the connections are superficial</p> <p>E – Shows some interest or engagement but remains somewhat “detached.”</p> <p>P – Acknowledges implicit aspects, but does not probe impact of implicit views</p> <p>H – Shows some awareness of the larger picture, but not sure how pieces fit together</p> <p>S/L – Identifies main issues, but terms and boundaries are not clear.</p>	<p>W – Clearly recognizes the importance of the <i>issue</i> and why it needs to be addressed within the context of their worldview</p> <p>E – Exhibits energy and engagement in addressing the issue</p> <p>P – Shows awareness of contextual, or implicit aspects of the issue</p> <p>H – Shows awareness of subsidiary or super-ordinate concepts; able to identify meaning/purpose in the situation</p> <p>S/L – Identifies the main issues in clear terms that lead to answerable questions</p>
Identifying Assumptions:		
<p>W – No real articulation of basic presuppositions</p> <p>E – No real commitment or passion for the presuppositions expressed</p> <p>P – No appreciation for diverse views (cultural, ethnical, religious, etc.).</p> <p>H – Little awareness of the broader set of views that are possible</p> <p>S/L – Shows black and white thinking. Positions are just wrong or right but no justification as to why.</p>	<p>W- Able to articulate beliefs, but they appear “borrowed” from others or held in superficial ways</p> <p>E – Shows some passion, but also some diffusion about ideas (it all depends)</p> <p>P- Some acknowledgement of diverse views, but less value is places on their merit (just wrong)</p> <p>H – Show awareness of various ideas, but not broad.</p> <p>S/L – May question assumptions but in superficial ways – not clear why there may be a problem. Still shows black/white thinking</p>	<p>W – Articulates a coherent set of personally held beliefs; articulates its relevance to the issue under investigation</p> <p>E – Shows commitment and passion for the <i>personal worldview</i> expressed</p> <p>P – Shows understanding, appreciation for, and the value of diverse views (cultural, ethnical, religious, etc.).</p> <p>H – Shows awareness of the broad scope of ideas and the potential variety of possibilities</p> <p>S/L – Clearly identifies and questions the (logical/scientific) validity of the assumptions and perspectives that influence thinking on the issue.</p>

Articulating a Thesis/Hypothesis:		
<p>W – No real worldview perspective evident; hypothesis is not evident or not connected to any worldview</p> <p>E – No passion or personally owned commitment – it just is</p> <p>P – Very egocentric perspectives – no understanding of how or why others think</p> <p>H – No awareness of the larger picture of potential answers and issues</p> <p>L – Very little logical structure; not need for logical support – it just is</p> <p>S – No clear testable hypothesis or not drawn logically from any existing knowledge or experience</p>	<p>W – Thesis appears consistent with worldview, but not explicit or well defined</p> <p>E – Seems interested and engaged, but commitment is not personally owned (e.g., borrowed from parents)</p> <p>P – Recognizes diverse views, but not clear why or how others come to that thinking.</p> <p>H – Aware of diverse views or ideas, but not sure about the big picture; not creative; uses simple algorithms</p> <p>L – Thinking is clear and logical but arguments & evidence are weak or not clearly connected</p> <p>S – Identifies a thesis or hypothesis, but not clearly defined or is weakly connected to existing knowledge</p>	<p>W – Articulates a viable hypothesis and perspective that draws support from, or is consistent with, their own worldview perspective</p> <p>E – Shows commitment and passion for the <i>thesis</i> expressed; thesis draws from personal experience, commitments</p> <p>P – Engages in diverse perspectives and demonstrates clear understanding of others’ ideas and the structure of their thinking.</p> <p>H – Shows awareness of the broad scope of ideas and the variety of potential answers</p> <p>L – Shows clear structure to their own thinking and the thesis follows reasonably (logically) from well established ideas / evidence.</p> <p>S – Has a clearly testable hypothesis that draws from existing knowledge and evidence</p>
Analyzing Evidence / Drawing Conclusions		
<p>W – Mixes opinion with evidence; conclusions are black and white</p> <p>E – Little engagement with the conclusions or solutions; solutions seem self-evident</p> <p>P – Little acknowledgement of alternative judgments, other views are just wrong (without justification)</p> <p>H – sees little deeper meaning in issues or images; solutions are simple</p>	<p>W – Occasionally confuses evidence with opinion; conclusions do not connect with presuppositions</p> <p>E – Engaged, but commitments to conclusions are borrowed and not fully supported</p> <p>P – Acknowledges other claims, but not fully evaluated; not sensitive to the why of other views</p> <p>H – Conclusions are coherent but not related to broader issues; thinking is conventional; meaning in</p>	<p>W – Can distinguish between worldviews/perspectives (i.e., opinions/views) from logical inference and scientific evidence</p> <p>E – Shows commitment to, and confidence in, the conclusions based and on the evidence, logic or perspectives provided</p> <p>P – Effectively evaluates claims, arguments, and value judgments; shows respect for diverse conclusions</p> <p>H – Infers coherent conclusions related to broader implications and issues; show divergent thinking/creativity in solutions;</p>

<p>L – Conclusions are not logically connected or little logical support is generated S – Not cognizant of scientific approaches to answer questions – refers more to authority or self-evident answers; allows bias to shape assessment of research; confuses cause-effect with correlation</p>	<p>events is superficial L – Inferences are only moderately supported, or arguments not convincing S – Shows some awareness of scientific method and the need for good methods, but may miss elements of good scientific reasoning</p>	<p>can infer meaning and purpose in conclusions L – Infers coherent and logically warranted conclusions S – Clearly distinguishes correlation and cause-effect; demonstrates clear appreciation for essentials of proper methods (sampling, measurement, reliability, internal and external validity, statistical inference)</p>
<p><i>Maturity / Metacognition</i></p>		
<p>W – No basis for their perspectives; or perspectives are simplistic and not applied meaningfully E – Not engaged in solutions or positions; remain detached from solutions P – Black and white thinking; worldviews are either right or wrong without justification; does not show charity to other views; cannot communicate effectively to other perspectives. H – Not self-reflective or aware of own thinking process; finds difficulty in seeing deeper meaning to the process or to images; seeks correct answers without causes S/L – Scientific or logical methods are OK as long as they serve the ends of the person’s views; does not consider audience when stating positions; finds it difficult to modify positions or arguments based on feedback</p>	<p>W – Some self-reflection on assumptions is evident; perspectives are consistent but not applied very meaningfully E – Passionate but not sure how they/others play a role; solutions are “out there” P – Recognizes complexity but less comfortable with ambiguity; recognizes bias potential, but less so for their views; accepts correction but not fully sure why; charitable to others but can’t articulate to diverse groups H – Understands broader implications of solutions; but not fully aware of their own thinking; meaning of this process is somewhat superficial S/L – Sees scientific /logical thinking as completely flawed or extremely trustworthy; audience is acknowledge but not effectively; response to feedback is partial and not fully comprehended</p>	<p>W – Able to show a well thought-out basis for their perspectives; able to apply perspectives in meaningful and dynamic ways E – Is passionate about the implications of their position and see themselves and others as being part of the solution P – Recognizes ambiguity and complexity; recognizes how their own worldview (correct or not) may bias observations & conclusions; accepts corrections in thinking with grace; shows ability to communicate to an audience with very different views/perspectives H – Understands broader implications of solutions; shows awareness of their own thinking process and the thinking process of others; able to find deeper meaning in the process of critical thinking S/L – Able to be self-aware of potential flaws and limitations of scientific and deductive thinking; able to identify audience and communicate to it; able to respond to feedback and make adjustments in arguments or methods</p>

Where are we teaching CT now?

All instructors in Philosophy 153 teach the types of arguments and the validity of arguments, but there are a variety of approaches to Intro Philosophy beyond that common denominator/baseline. English 101 also emphasizes CT.

In fact, it seems to us that instructors in every discipline at Calvin see themselves as teaching CT. However, faculty are by-and-large unaware of what each other is doing in this area; there is no common vocabulary for discussing CT on campus; there is no systematic pedagogy for leading students to develop higher levels of CT.

Results of the CAAP test

In the last week of May, all first year students in English 101 took a Collegiate Assessment of Academic Proficiency (CAAP) test. 402 students participated – 207 took a writing skills module and 195 took a Critical Thinking module. The test consisted of multiple-choice questions. Typically the CT module presented students with a scenario and then asked about various inferences that might be made based on information contained in the scenario or asked students to critique the reasoning of characters in the scenario.

160 of the students who took the CT test were freshmen. Probably the most remarkable feature of our students' results is that they are so unremarkable. The scores are reported on a scale from 40 (low) to 80 (high). Our students averaged 63.1 and the national average was 62.7. Our high score was 73 (99th percentile compared to the population of all students who took the test); our low was 50 (1st percentile.) Asian students scored slightly lower (mean = 60, 34th percentile) than Caucasian students (mean = 63). Students whose first language was not English also scored slightly lower (mean = 60) than the overall average. The scores by GPA were:

Cumulative GPA	Average score
Below 2.00	60
2.01 - 2.50	60
2.51 – 3.00	61
3.01 - 3.50	64
3.51 - 4.00	66

The scores varied by major from a high of 67 (79th percentile, Foreign Languages) to a low of 60 (Fine and Applied Arts). However, only 5 foreign language majors took the test. Engineering with 15 students and an average of 65 (65th percentile) was second highest.

Nevertheless, according to this test, the CT skills of our second semester first year students are very typical of college students their age. It would be very interesting to give this test to a group of our seniors and see how they compare to national norms for seniors.

Recommendations

1. That in the next academic year, a randomly selected group of about 200 seniors be given the CAAP CT test to see if we can find evidence of how our students have progressed relative to students at other colleges;
2. That the Core Curriculum Committee (CCC) be asked to consider ways to strengthen the teaching of CT in the first year at Calvin. Such ways could include increased emphasis on CT in Prelude and/or DCM or more extensive changes to the first year experience;
3. That the CCC convene a team of faculty representing all courses taken by most first year students to consider how to strengthen the teaching of CT in the first year;
4. That the Writing Program be asked to consider ways to strengthen the role of CT in each department's writing program;
5. That the Provost ask the Philosophy Department to convene a team of people to think through ways to incorporate CT skills more extensively in Philosophy 153. The team should be led by Philosophy but should include someone representing English 101, someone from the library, and at least one person from another department. The strengthened focus on CT in Philosophy 153 should consider applications in other disciplines and aim to develop a common vocabulary for describing and analyzing arguments. Once the team completes its work, a summer stipend should be given to someone(s) to develop a CT unit for Philosophy 153. Once this unit is completed, the entire faculty should be made aware of it in such a way that they can build on it in their own teaching;
6. That the English Department be encouraged to discuss ways they could use the rubric in English 101 as a way to communicate our expectations for CT to students;
7. That the CT rubric be widely distributed among faculty as a resource they can use to encourage the development of CT skills among our students;
8. That the fall faculty conference include a discussion of Critical Thinking as one of its parallel sessions.
9. That the new Dean of Institutional Effectiveness oversee completion of the previous recommendations.

Acknowledgments

A workshop focused on CT was held at Calvin College on June 11 and 12, 2007. The workshop participants reviewed this document, paying especial attention to the rubric and the recommendations. They suggested many improvements and contributed the disciplinary ideas presented in the Appendix. Participants were Steven Putt, Rick Baez, Paul Moes, Glenn Remelts, Jolene Vos-Camy, Sarah Kolk, Barbara Carvill, Marlys Admiraal, Julie Walton, Sheila Bluhm, Gloria Jea, Andrea Granderson-Kitomary, Diane Wright, Karen Vander Laan, Rob Bobeldyk, Cynthia Slagter, Ron Feenstra, Karin Maag, Karl Van Dyke, Dave Koetje, Debra Bossenbroek, and Jeremy Frens.

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[Scriven] Scriven, Michael, and Paul, Richard, *Defining Critical Thinking*, www.criticalthinking.org/aboutCT/definingCT.shtml, 2004

[WSU] *The New Critical and Integrative Thinking Rubric, Fall 2006*, <http://wsuproject.wsu.edu/ctr.htm>

Appendix

The following ideas were offered by Critical Thinking Workshop participants as part of a brainstorming session on how the CT rubric could be used in various areas across the college. (No promises were made or implied by any of these suggestions.)

For any discipline

Use the rubric as a meta-cognitive piece for longer writing assignments at an advanced level. I.e., students prepare a first draft then receive the rubric and respond in writing to their own writing – How well have they accomplished the tasks? Students then rewrite and turn in all versions and critiques.

Art

Have students compare visuals from the 1940s and 2000s according to various themes such as how parenting is represented; use the rubric to guide and evaluate the comparisons.

Biology

We could use the rubric as a tool for assessing our writing program. One can imagine the general CT rubric being contextualized for Biology with a few tweaks here and there. This Biology CT rubric would likely be used with incoming students or in the proposed sophomore-level Intro to Research course to establish a baseline for our students. Then in the capstone courses, we could use the rubric again to assess a similar writing/critical thinking assignment.

It could also serve as a source of criteria for incorporating into grading rubrics for specific writing assignments including annotated bibliographies, review articles, research articles, white papers, and position papers.

Chemistry

Students tend to see Chemistry labs as following recipes. But they need to develop several intellectual skills addressed in the rubric. For example,

- The importance of engaging the issue – Why should I? Why does it matter? Students could be required to formulate at least part of the question.
- Hypothesis – we would need to change the approach so that students have to build an experiment to test their assumptions

- Analyzing and drawing conclusions – comparing to the original assumption and hypotheses – Oh, oh moments where they realize they don’t have the data they need and have to figure out how to get it – opening the option to go back and reassess assumptions, modify hypotheses, and have another chance to collect data
- Responding – acknowledging limitations and ambiguity yet still drawing conclusions in light of that

Computer science

One of the obvious places for CT is in the application of computer science. Is Wikipedia a good idea? Is Google really “not evil” with my data? How responsible do we need to be for identity theft? I see the rubric as sufficient for critically thinking about these questions.

The other place for CT is what scientists call “choice of methodology.” No programming language is sufficient or effective for all problems. Picking the right language for the job is a CT activity. This use of CT can also be found elsewhere in CS: picking the better algorithm, picking the better software, picking the better software development methodology.

Core

Introduce the rubric to all students in an early core course after which other courses will assume students know it and other faculty can use it. Faculty in other core courses could use all or part of it as fits their course.

Education

Use a guide in formulating key assignments at various levels for use in NCATE assessment documents

English

Many parts of the rubric apply to the kinds of assignments – arguments incorporating research – that are common in Written Rhetoric. The rubric could be used both as a teaching tool and as an evaluation tool. I would encourage students to have the criteria in mind as they proceed through the stages in the writing process and as they revise their drafts. For example,

- Selecting a topic (think about its aspects and their importance)
- Selecting and responding to sources (choose varied sources and read them carefully and thoroughly)
- Supporting a thesis (evaluate evidence found in sources and present it logically)

Foreign language in general

Have students analyze a piece of writing in the target language written by a member of the target culture. Ask if the elements of the rubric apply equally well.

French

With writing assignments, the rubric will help professors be more aware of what they are looking for in an assignment. It can also help to take points from the rubric and give them to students to let them know the type of thinking we expect them to demonstrate on their writing assignments.

I see it as most helpful in upper level courses where writing assignments are related to literary pieces. It could also inform class discussion on literature to bring out aspects/perspectives on a piece that we want to see later in a written analysis. In 300 level literature courses, I ask for daily response papers to the literature assigned and this can help with the analytic parts of those papers as well as with coming up with good questions on the literature and its context. In core courses where grammar skills are the main focus, the rubric can also help in writing assignments having to do with cultural analysis.

German

The rubric represents the Western, Anglo-American, common sense tradition, for enlightened discourse in leadership roles in American democratic society.

Parts could be used to guide the writing of major essays and to evaluate academic articles about works studied in class. It could also be used on short writings in class by asking students to write answers to a question paying particular attention to one item in the rubric.

The rubric could also be customized for the German Dept, especially for intercultural competence and CT.

History

In History, we could use the rubric to help develop CT skills among students in the core History classes (151 and 152), chiefly by modeling and framing analysis of primary source documents. Many students have never analyzed a primary source before. The rubric could be adapted to give more focused guidance.

We could also use the rubric in our research methods course (History 294.) This two-credit course is taken by all majors and minors, ideally no later than their sophomore year. The rubric could be used to good effect in showing students what CT involves and in helping them develop those skills through various assignments.

HPERDS

The rubric could be used to help an instructor grade a variety of different assignments, for example:

- Addressing nutrition myths and controversies,
- Writing assignments for core addressing embodiment, stewardship, desire to please God,

- Journal article reviews in upper level course such as physiology both to improve science literacy and to develop possible new/original research questions
- Writing assignments that address physical yet seemingly intractable problems such as hunger, disease and health care, obesity, body image, addiction, cheating, and violence in sport
- In class written responses to a contemporary issue
- Case studies
- Issues related to having an infant such as spouse's attitudes, financial considerations, health issues, faith-informed choice, adoption, what's best for the infant – getting students off black-white responses and develop empathy and charity for the choices a new parent faces
- Lab reports

All such assignments could be collected into a four year portfolio along with the rubric as a means to demonstrate and assess growth in a student's thinking.

Library

Break a class up into 4 or 5 groups and give each group a different article. Also distribute an evaluation rubric – the group would identify the quality of the article assigned to it.

Compare an article in Wikipedia with a commercially produced encyclopedia – subject or general.

The rubric could be used to evaluate the sources that an author relies upon to substantiate arguments or points in his or her writing. “Accomplished” critical thinkers will have collected, and presumably investigated, a variety of sources which will add value/authority to their writing.

The rubric could also be used to help someone identify self-affirming information seeking behavior; that is, applying certain points of the rubric to determine if you are only allowing yourself to collect and investigate sources (ideas) which affirm what you desire.

Mosaic

Mosaic is a one-credit class addressing issues of racism and culture. In many ways, the program requires students to analyze their world views and basic assumptions regarding how the world functions. This rubric helps identify specific learning tasks to be addressed – it will help tighten up/focus journal questions. Knowing and having a vision of where you want the students to be (articulate about race and privilege, understanding or personal racism and ethnocentrism) allows for clearly stated and directive questioning.

It would be beneficial for the program to take this rubric and integrate it with current learning objectives. As many of the formal assessments are done in group discussions and personal conversations, it would be good to tailor it. One requirement is for students to attend four learning events each semester (some lecture, activity, event that allows them to engage issues of culture, race, or antiracism). Afterward they are required to have a fifteen minute conversation

with the program assistants about what they learned. This is a perfect opportunity for some critical thinking and self-examination – for example, distinguishing between opinion and evidence (stereotyping vs. cultural awareness), seeing how their worldview influenced how they listened to that lecture or watched that dance or engaged that cultural holiday.

Nursing

Use parts of the rubric for particular written assignments and also for assessment in post clinical conference discussion of cases.

Many individual bullets under the “Accomplished” section put words to what we are looking for in student behaviors.

Utilize parts of the rubric as bulleted behaviors beneath practicum course objectives. One of the objectives in each Nursing practicum concerns critical thinking and ethical decision-making. The rubric bullets may help to make clear what behavior (both written and observed practice) is expected.

Perhaps do one assignment each semester specifically geared to the rubric – focus on identifying an engaging an issue, assessing context, articulating a position/hypothesis, evaluating supporting evidence, formulating a conclusion and discussing integration with current/future practice. A similar pattern could be followed with practicum assignments.

Prelude

Use the rubric to help make CT personal and experiential for students.

Psychology

We could use the rubric in assessing senior essays. However, we would need to tailor the questions so that the rubric is appropriate and/or extract only the relevant parts of the rubric.

We could also use it as part of peer review in an upper level research course. This could improve their critique and sharpen their own abilities.

I could use elements of the rubric to review (not necessarily grade) some assignments in introductory courses. It will shape the nature of the assignments given. I will now ask students to be more explicit about their own self-reflection and to think about why some approach is flawed or has merit.

We could introduce the rubric in the first week of Psychology 151, have group discussions in class using the CT rubric on various topics such as sexual orientation, research, culture, and violence. We could ask questions on CT on the first test.