CRITICAL THINKING: AN EXTENDED DEFINITION

KEN PETRESS

Professor Emeritus
University of Maine at Presque Isle

Critical thinking is a pervasive academic literature term that is seldom clearly or comprehensively defined. The definitions that are available in various sources are quite disparate and are often narrowly field dependent. "Definitions tend to so broad they are not always helpful in the sense of defining a concrete entity."[1] For a term that is often expressed by many as crucial to solid thinking and clear expression, a more accepted, comprehensive, and clear understanding of the term seems useful. This article offers for thought and debate a brief literature review related to critical thinking. This review will be assembled by combining other sources' definitions into this article. It is readily understood that not all users of the term will wish to utilize every possible definitional aspect of critical thinking in their work and conversation; however, having a broad definition resource available for reference may be a valuable tool when the term is broached by scholars.

One definition of critical thinking found in a general psychology text is: "Critical thinking examines assumptions, discerns hidden values, evaluates evidence, and assesses conclusions." This text also emphasizes recognizing fallacies in our thinking and listening.[2] This definition; however, omits explaining how to examine assumptions, discern hidden values, and to assess conclusions. Considering a conversant's/listener's or author's/reader's experiences; education; social, political, economic, and/or ideological proclivities; known or suspected biases and prejudices; and known or suspected motives might accomplish assessing assumptions, hidden values, and conclusions.

Warnick and Inch, communication scholars define critical thinking as "involving the ability to explore a problem, question, or situation; integrate all the available information about it; arrive a solution or hypothesis; and justify one's position."[3] This definition excludes specifying ways to explore problems, to raise good questions, to integrate available information, to arrive at solutions/hypotheses, and how to justify positions taken. Problems can be effectively explored by seeking parsimony, clarity, lower costs, and greater consensus for their solution. Good questions probe for more/better information and offer others awareness that the have been paid attention to. The scientific method is a good start in arriving at quality solutions/hypotheses. Positions should be justified on the basis of their cost, amount of collateral damage incurred, and analysis of the process taken to reach such positions.

Ken Petress, communication scholar and journalist, adds needed content characteristics to critical thinking; among these are:

Evidence is rated, by the critical thinker, based on **Sufficiency** – is there an adequate amount of sup-

port for claims? **Relevance** – is the evidence presented pertinent to the issue at hand? **Reliability** – does the support for arguments have a good track record? Does evidence relied upon emanate from expert sources? **Consistency** – are supporting elements internally and externally consistent with each other and with what we know from other experiences, observations, and sources? **Recency** – is offered support current rather than being out-of-date? **Access** – are supporting materials open for receivers' verification? Are secret or anonymous sources avoided? *Objectivity* – are supporting materials fair and undistorted? Does support originate from expert sources?[4]

These six criteria limit themselves to the content of messages; other criteria need to be considered for message organization, ethicality, consequence forecasting/consideration, ands content completeness. Some additional factors influencing critical thinking and message reception/creation include: Are embedded terms clearly and completely defined? Are inferences labeled as such instead of being passed off as assertions of fact? Are ideas phrased concretely and clearly rather than vaguely, in abstract form, or with equivocation? Are messages coherent? Are discipline or situation dependencies explained when they occur?[5]

Philosopher Richard Paul and educational psychologists Linda Elder have written extensively on the subject of critical thinking.[6] Paul and Elder define critical thinking as: "That mode of think-

ing – about any subject, content, or problem – in which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them."[7] Paul and Elder emphasize "asking vital questions," "gathering relevant information," "testing well reasoned conclusions and solutions," "thinking open mindedly," "recognizing and assessing" … "their assumptions, implications, and practical consequences" and "communicating effectively."[8] Paul and Elder offer a list of what they call "elements of thought:" purpose, information, inferences/conclusions, concepts, assumptions, points of view, implications/consequences, and questions.[9] Paul and Elder suggest nine qualities that make messages optimally useful; these include: "clarity, accuracy, precision, relevance, depth, breadth, logic, significance, and fairness."[10]

While Paul and Elder repeatedly emphasize asking quality questions, they fail to specify what kind of questions to raise. By implication, it seems, they refer to questions of specification, amplification, kind/category, verification/validation, degree, magnitude, motive, detail, and questions designed to probe, challenge, and motivate. Questions need to be direct, clear, relevant, concrete, as unbiased as possible, specific, asked in a civil tone, and asked in a way that makes the questioner's motives/needs clear to be maximally effective and to ensure expected responses to result.

Michael Scriven and Richard Paul offer the following definition of critical thinking:

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.[11]

Scriven and Paul explain critical thinking as a process, not an end. Their list of sources of information/insight excludes explicit mention of experimental results and research, an omission that needs correction. Their "disciplined" requirement suggests that critical thinking is a learned skill; it is methodical, and it is thought out, not random.

Educator, Diane F. Halpern posits the following definition of critical thinking:

Critical thinking is the use of those cognitive skills or strategies that increase the probability of a positive outcome. It is used to describe thinking that is purposeful, reasoned, ands goal directed – the kind of thinking involved in problem solving, formulating inferences, calculating likelihoods, and making decisions when the thinker is using skills that are thoughtful and effective for the particular context and type of thinking task. Critical thinking also involves evaluating the thinking process – the reasoning that went into the conclusion we've arrived at the kinds of factors considered in making a decision. Critical thinking is sometimes called directed think-

ing because it focuses on a desired outcome.[12]

This definition of critical thinking – along with others to a lesser direct degree – emphasizes implicitly that critical thinking takes time, energy, skill, and dedication. It is frustrating but important for critical thinkers to be and to stay aware of that not all persons with whom we communicate with are skilled in critical thinking or do not always exercise their critical thinking skills at every communication event. Communication is a dialogic event which requires some level of mutual awareness and cooperation between communicants.[13]

Media educator, S. Ferrett, suggests the following fifteen characteristics of a critical thinker: [14]

- Ask pertinent questions.
- Assess statements and arguments.
- Are able to admit a lack of understanding or information.
- Have a sense of curiosity.
- Are interested in finding new solutions.
- Are able to clearly define a set of criteria for analyzing ideas.
- Are willing to examine beliefs, assumptions, and opinions and weigh them against facts.
- Listen carefully to others and are able to give feedback.
- Suspend judgment until all facts have bee gathered and considered.
- Look for evidence to support assumptions and beliefs.
- Are able to adjust opinions when new facts are found.
- Look for proof.
- Examine problems closely.

- Are able to reject information that is incorrect or irrelevant.
- See that critical thinking is a lifelong process of self-assessment.

Ferrett's list supports the dialogic approach mentioned above, requires good listening skills, values healthy skepticism, and suggests a tentative approach when receiving claims from others.

Anderson, Krathwohl, and Bloom remind us of a decades old model for critical thinking; that model included:[15]

- **Knowledge** – what we experience, observe, intuit, and research.
- **Comprehension** – ho well we internalize, recall, and are able to connect with other information.
- **Inference** – making conjectures or educated guesses about what we do not have adequate data based on what we do know.
- **Application** – how well we can put what we know to use.
- **Analysis** – how well we can see parts/sub-parts; how components work together; what consequences are or are likely to be; and detecting needed procedures/limits/costs.
- **Synthesis** – detecting and working with an amalgamation of ideas, substance, or events.
- **Evaluation** – rendering judgments about what we know and do.

This work, while produced for the education domain, is nevertheless easily transferable to most other fields. This taxonomy emphasizes more what we do with our knowledge that examining the quality or nature of what we know. Combining this taxonomical approach with any one or few other earlier discussed approaches makes a useful compendium of critical thinking activity.

Scientists at the author's home institution offer the following characteristics of critical thinking:[16]

- Critical thinkers need an active imagination that allows never before seen phenomena to be interesting and therefore become useful in their work.
- Critical thinkers need to be able to anticipate occurrences, results, or accidents; anticipation is part of thinking ahead.
- Critical thinkers need a keen power of observation; many times it is the miniscule, the incidental, or the tangential that holds the mystery of our inquiries.
- Critical thinkers need to become facile with abstract thought and to be able to share abstractions in coherent ways with others.
- Critical thinkers need to be able to detect, describe/report, and use relationships (ie: cause-effect; co-cause, co-effect, symbiosis) between phenomena.
- Critical thinkers need to be able to sort/categorize what they observe, experience, research, and experiment with. Such sorting/categorization frequently produces new knowledge.
- Critical thinkers must be willing to submit their ideas and experiments to peer review; be able to accept – in many cases, even solicit -- challenges and criticism to their work; and must submit their findings to repeat tests.

- Critical thinkers need to demand and use adequate time to solved problems

and to think about what is done.

Several of these characteristics have appeared in only a few lists from other disciplines; while these may seem discipline centered, they do apply to many other fields of endeavor as well.

The Advanced Technology Environmental Education Center advances the following characteristics of critical thinkers: [17]

- Draw conclusions from a set of facts (ie: data)
- Correlate results and plan action needed
- Make comparative judgments from data
- Diagnose problems from a set of data and observations, and identify solutions.
- Interpret data generated for records, files, and reports.
- Analyze data for accuracy.
- Identify, assimilate, integrate, and evaluate information from diverse sources.
- Make decisions based on large and small amounts of information, some of which may be ambiguous.
- Recognize one's limitations.
- Recognize and correct discrepancies.

The authors recommend generating new ideas by doing the following: "use imagination feely," "combining ideas or information in new ways," "making connections between seemingly unrelated ideas" and "reshaping goals in ways that revel new possibilities."[18]

Critical thinking is important in the arts as well. The Center for educator development in fine arts makes some suggestions in the vein including: critical thinkers must "make choices within the structure of music;" critical thinkers must come t value practice/repetition to improve their skills; critical thinkers need to be accepting of "opposing critiques" to their efforts; critical thinkers must value cooperative learning; critical thinkers need to learn that competition is healthy; and critical thinkers have to realize that the product of one's endeavors are judged by others who typically do not have the artist's skills or motivation.

Critical thinking, it has been shown, has varied definitions. There are several aspects of the term common to many sources and there are some characteristics unique to various disciplines. This literature review is designed to provide readers wit a varied sense of what the term critical thinking means in various contexts. It is hoped that this resource might be helpful to scholars in better understanding others' use of the term; to better allow speakers, listeners, readers, and writers to better use this pervasive term in academic literature. This work is not intended to be an end point in the discussion of critical thinking; it is meant to be a rejuvenating and motivating stimulus for further discussion of the subject.

References

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[2]David G. Myers. (2003). *Exploring Psychology,* *5th ed.* New York: Worth, pp. xv, 11.

[3]Barbara Warnick and Edward . Inch. (1994). *Critical Thinking and Communication,* 2nd ed. New York: Macmillan, p. 11.

[4]Ken Petress. (1998, September 18). What Is Critical Thinking and Why Is It Useful? *University Times*, p. 3, 7; University of Maine at Presque Isle.

[5]These factors originate from the author's class notes in public speaking; they relate to all modes of communication, however.

[6]See for example: Richard Paul and Linda Elder. (2001). *The Miniature Guide to Critical Thinking:Concepts and Tools.* Dillon Beach, CA: *The Foundation for Critical Thinking*; Richard W. Paul. (1995). *Critical Thinking: How to Prepare Students For a Rapidly Changing World. Foundation for Critical Thinking*; Richard Paul and Linda Elder. (2001). *Critical Thinking: Tools for Taking Charge of Your Learning and Your Life.* New York: Prentice Hall; and Richard Paul and Linda Elder. (2002). *Critical Thinking: Tools for Talking Charge of Your Professional and Personal Life.* New York: Prentice Hall.

[7]Paul and Elder. The Miniature Guide to Critical Thinking, p. 1.

[8]Paul and Elder. The Miniature Guide to Critical Thinking, p. 1.

[9]Paul and Elder. The Miniature Guide to Critical Thinking, p. 5.

[10]Paul and Elder. The Miniature Guide to Critical Thinking, pp. 7-9.

[11]Michael Scriven and Richard Paul. (2003). *Defining Critical Thinking.* (http://www.criticalthinking.org/University/univclass/Defining.html

[12]Diane F. Halpern. (1996). *Thought and Knowledge: An Introduction to Critical Thinking Mahwah, NJ: Erlbaum Associates.*

[13]Richard L. Johannesen. (2002). *Ethics in Human Communication*, 5th ed. Waveland Press, 55-76.

[14]S. Ferrett. (1997). *Peak Performance. Cited in GED 20902: Online Professional Development at* http://www.ket.org/ged2002/critical/cr3.htm.

[15]Lorin W. Anderson, David R. Krathwohl, and Benjamin S. Bloom. (2001). *A Taxonomy for Learning Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.*

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[17]ATEEC. (2003). *Math Knowledge and Skills for Environmental Technology Careers.* Critical thinking skills, p. 4 in http://www.ateec.org/core/k-smath.cfm.

[18]ATEEC, p. 4.