
Effectiveness of Critical Thinking Instruction

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Abstract

Critical thinking changes with context, there's no one definition — there are several that complement one another. Critical thinking doesn't mean simply criticism. It means not accepting information at face value. It helps individuals improve the quality of their lives and makes them more rational. Critical thinking makes it necessary to develop very specific ways to measure progress and results. Thinking is part of the human nature, based on the individual's experience. Excellence in thinking, however, could be achieved with hard work. Critical thinking involves continuous attempts to explore knowledge on the basis of evidence that supports it. It is the process of searching, obtaining and evaluating information to develop one's thinking, and the ability to use this information by adding creativity. These abilities are essential for making sound judgments. Critical thinking is a way of going about living and learning that empowers us and our students in quite practical ways. When taken seriously, it can transform every dimension of school life: how we formulate and promulgate rules; how we relate to our students; how we encourage them to relate to each other; how we cultivate their reading, writing, speaking, and listening. The common denominators of critical thinking are the most important by-products of the history of critical thinking. Critical thinking requires the systematic monitoring of thought; that thinking, to be critical, must not be accepted at face value but must be analyzed and assessed for its clarity, accuracy and relevance. Critical thinking, by its very nature, requires that all reasoning proceeds from some goals and objectives; that all data when used in reasoning must be interpreted.

Key words: motivation, reasoning, subject matter, higher order thinking, cognitive, assessment, assumption, uncritical, self-guided

Definition of critical thinking

Critical thinking has been carved out in intellectual debate and dispute through 2400 years of intellectual history. That history allows us to distinguish two contradictory intellectual tendencies: a tendency on the part of the large majority to uncritically accept whatever was believed as more or less eternal truth, and a conflicting tendency on the part of a small minority — those who thought critically — to systematically question what was commonly accepted, and seek, as a result, to establish sounder, more reflective criteria and standards for judging what it does and does not make sense to accept as true.

Critical thinking describes the process of analyzing and evaluating information using certain cognitive skills to reach a specific goal or achieve a specific result. Definitions of critical thinking vary, but all of them involve words such as reasoning, reflection, judgment and evaluation. Based on a study conducted in 1995, Jones, Dougherty¹, describe critical thinking as "reasoning in an open-ended manner and with an unlimited number of solutions". Another definition explains critical thinking as the process of evaluation in terms of some previously accepted standards," that involve attitude plus knowledge of facts plus some thinking skills."

The term critical thinking emerged in the mid 20th century. According to B. K. Beyer², critical thinking is a mode of thinking about any subject or problem in which one uses criteria to judge the quality of the subject and assess its validity. He defines critical thinking as a way to think about one's thinking with the aim to identify its strengths and weaknesses and eventually

1 1995, Jones, Dougherty Journal of Geography in Higher Education, Vol. 23, No. 3, 1999, pp. 349-357

2 B. K. Beyer Critical thinking (1995)

3 C. Wade (volume 22 of the journal Teaching of Psychology from 1995)

improve its quality. According to C. Wade¹, critical thinking is based on asking questions, defining a problem, examining evidence and analyzing assumptions.

Edward Glaser² defines critical thinking as the "ability to think critically," an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences.

Linda Elder³ assumes that critical thinking is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fair-minded way. People who think critically consistently attempt to live rationally and reasonably. They are aware of the flawed nature of human thinking when left unchecked. They strive to diminish the power of their egocentric tendencies. People use the intellectual tools that critical thinking offers – concepts and principles that enable them to analyze, assess, and improve thinking. Elder argues that people work diligently to develop the intellectual virtues of intellectual integrity, intellectual civility, intellectual sense of justice and confidence in reason.

People realize that no matter how skilled they are as thinkers, they can always improve their reasoning abilities and they will always at times fall prey to mistakes in reasoning, human irrationality, prejudices, distortions, social rules and taboos, and self-interest. People strive to improve in whatever ways they can and contribute to a more rational, civilized society. They strive not to think simplistically about complicated issues and always consider the rights and needs of others. They recognize the complexities as thinkers, and commit themselves to life-long practice toward self-improvement.

Critical thinking is that mode of thinking in which the thinker improves the quality of his or her thinking by skillfully analyzing, assessing, and reconstructing it. Halpern⁴ argues that critical thinking is self-directed, self-disciplined, self-monitored, and self-corrective thinking. Critical thinking entails effective communication and problem-solving abilities, as well as a commitment to overcome our native egocentrism and socio-centrism.

One difficulty in discussing critical thinking stems from the lack of a common definition. In part, this difficulty is the result of a multitude of terms describing this cognitive activity. The process is variously referred to as reasoning, higher order thinking, intelligent behaviour, creative thinking, and thinking, each with its own meaning.

Glasman⁵ outlines four areas of activity:

- the ability to identify and formulate problems as well as the ability to propose and evaluate ways to solve them;
- the ability to recognize and use inductive and deductive reasoning;
- the ability to draw reasonable conclusions from information found in various sources (written, spoken, tables, graphs), and to defend one's conclusions rationally;
- the ability to distinguish between fact and opinion

Another group defines higher order thinking as "a sustained effort directed at solving a complex problem, that requires a student to integrate different sources of information, consider alternative perspectives and make critical judgments, ". Keating⁶ describes the four components of creative thinking: (1) content knowledge -- familiarity with an accumulated base of knowledge and experience; (2) divergent thinking--the ability to generate new ideas from the knowledge base; (3) critical analysis-- the ability to consider alternatives; and (4) communication skills-- the ability to develop a product to be evaluated in a social content, outside the individual.

Doyle⁷ defines higher order processing skills, those requiring critical thinking, as the cognitive processes of comprehension, interpretation; flexible application of knowledge and skills, and assembly of information and resources. These higher order thinking processes produce new knowledge or knowledge in new forms; lower order processes reproduce knowledge from memory or through the application of routine.

Despite the disagreement over definition, and its resulting instruction, critical thinking is widely accepted as an important academic outcome for schools. Much of our thinking is biased, distorted, partial, or prejudiced. Yet, the quality of our life

4 Edward Glaser: An experiment in the development of critical thinking, Columbia University, 1951

1 Linda Elder, *Critical Thinking: Tools for Taking Charge of Your Learning and Your Life*, 2011

2 Halpern, *Thought and knowledge/An introduction to critical thinking*, 2003

3 Glasman (1984). Preface. *Review of Educational Research*, 54, 461-471.

4 Keating (1980, pp. 57-58) *Four faces of creativity: Gifted Child Quarterly*

5 Doyle (1984) *Effective classroom practices for secondary schools*. Austin: The University of Texas .

and that of what we produce, or make depends on the quality of our thought. Shoddy thinking is costly, both in money and in quality of life. Excellence in thought, however, must be systematically cultivated.

Teaching critical thinking skills

How do teachers develop students' ability to reason? How do they transform their conceptions of subject matter into instructional processes--presenting information, designing work tasks for students, and maintaining student involvement in these tasks?

The difficult work of teaching well is an issue that continues to challenge those who are thoughtful about their work. "It will always be difficult," Barzun¹ wrote, "to teach well, to learn accurately; to read, write, and count readily and competently; to acquire a sense of history and develop a taste for literature and the arts--in short, to instruct and start one's education or another's"

An understanding of how critical thinking can be taught requires an understanding of the cognitive work of individual teachers.

Teaching critical thinking calls to the forefront an understanding of teacher knowledge as well as performance. It involves teaching students to use higher order thinking processes that require the manipulation of information rather than the reproduction of knowledge.

Teaching critical thinking is, therefore, based upon a teacher's broad and deep understanding of subject matter and a representation of that understanding in multiple forms as work activities for students. Thus, critical thinking is context-bound. Its effective strategies vary by subject matter, by an individual teacher's conception of that subject matter, by the way that conception is represented in work tasks for students, by a teacher's ability to engage and sustain student attention in those tasks and by combining information about academic work that students and teachers are trying to accomplish.

In order to improve academic instruction effectively, efforts must be made upon an understanding of how teachers think about content and how they make that understanding explicit for students. (Calfee; Shulman,)². Teachers' effectiveness in teaching critical thinking is based on teachers' understanding of their work; hence, it is viewed as subject to change rather than fixed and unchanging.

The process of teaching reasoning is a network of relations among a teacher's knowledge, instructional decisions, and classroom management and organization, which can be articulated by individual teachers. The manner in which a teacher teaches knowledge also reflects the values and goals of a teacher. This role requires knowledge of rules and principles of critical thinking, knowledge of subject matter and pedagogy, and knowledge of the ways to transform and apply appropriate rules and subject matter in organizing particular classrooms for learning.

Promoting student thinking skills requires careful planning if reasoning is to be practiced systematically and regularly. Some tasks, memory and procedural, require the reproduction of knowledge; others, comprehension and opinion, require the production of new knowledge, higher order thinking. Each requires different cognitive strategies for processing information. The memory task requires a student to memorize material and reproduce it accurately. The comprehension or understanding task requires students to understand and apply previous knowledge to problems, and make inferences and predictions.

In opinion tasks students state preferences. Completing a task thus has two consequences. "First, a person will acquire information-- facts, concepts, principles, solutions--involved in the particular task that is accomplished. Second, a person will practice operations--memorizing, classifying, inferring, analyzing--used to obtain or produce the information demanded in the task" (Doyle)³. The cognitive skills students learn are dependent upon the tasks they are assigned.

Prior knowledge plays an important role in learning. Students already have preconceptions of the meaning of most new concepts that are presented in the classroom. "Thus learning and understanding do not mean the passive filling up of a container, but rather mean a restructuring of knowledge that is already present (Bromme)⁴. Teaching begins with a teacher's understanding of what is to be learned and how it is to be taught. It proceeds through a series of activities during which the

1 Barzun (1981) *Teacher in America*. Indianapolis: Liberty Press

2 Calfee; Shulman, 1986 *Explicitness characterizes good teaching*. Paper presented at the meeting of the American Educational Research Association, San Francisco.

3 Doyle, 1983, "Academic work". *Review of Educational Research*, 53, p. 162

4 Bromme, R "Teachers' assessments of students' difficulties and progress in understanding the classroom". London: Cassell. p. 139 (1987)

students are provided specific instruction and opportunities for learning, though the learning itself ultimately remains the responsibility of the students. Teaching ends with new comprehension by both the teacher and the student.

Students learn more when opportunities for learning increase, when they are actively engaged in activities, and when they are successful in solving the problems presented (Denham and Lieberman)¹. Student cooperation does not exist a priori in classrooms. Its presence, or absence, is the result of a teacher's skill in securing and sustaining that cooperation. If a teacher specifies objectives, selects learning activities, organizes learning activities, and specifies evaluation procedures in a neat orderly fashion, the lesson will proceed smoothly.

To complete a learning task, students must be able to display a capability that does not presently exist. In order to perform successfully, they must bridge gaps between their understanding and the product to be produced by processing information. The wider the gap is between the known and the unknown, the greater the student's risk of failure. Because some tasks call upon known information or procedures, the amount of needed learning is small and the risk low. Critical thinking tasks, however, require large amounts of new learning and, as such, carry greater risk of failure. It is the ambiguous and risky nature of critical thinking tasks that makes them more difficult for teachers to manage in classrooms). "The more complex a program of action for an activity, the more difficult a management task a teacher faces" (Doyle)².

In order to develop critical thinking skills in students, teachers need a broad and deep understanding of subject matter and an understanding of the pedagogical strategies needed to transform and make public that understanding.

Teaching critical thinking is of great importance in the current age when one has access to an enormous amount of information through technology. Students are often passive receptors of information so they need to be taught how to weed through the information and decide what is important. Critical thinking can be applied both to students' academic studies and to solving complex problems in life.

A teacher can use ongoing classroom assessment to enhance and monitor students' critical thinking. For example, students can be asked questions such as "What was the most important thing you learned in today's class?" or "What question related to this session remains uppermost in your mind?" Another strategy to foster critical thinking is to put students in group learning situations where they can get continuous support and feedback from both the teacher and other students.

Independent of the subject studied, students need to be able to articulate thinking about thinking that reflects basic command of the intellectual dimensions of thought: "Let's see, what is the most fundamental issue here? From what point of view should I approach this problem? Does it make sense for me to assume this? From these data may I infer this? What is implied in this graph? What is the fundamental concept here? Is this consistent with that? What makes this question complex? How could I check the accuracy of these data? If this is so, what else is implied? Is this a credible source of information?"

Students need not be taught history simply as a body of facts to memorize; they can now be taught history as historical reasoning. Classes can be designed so that students learn to think historically and develop skills and abilities essential to historical thought. Math can be taught so that the emphasis is on mathematical reasoning. Students can learn to think geographically, economically, biologically, chemically, in courses within these disciplines. In principle, students can be taught so that they learn how to bring the basic tools of disciplined reasoning into every subject they study.

The case study or discussion method is a method in which the teacher presents a case and encourages students to reach a conclusion by leading them into a discussion through prepared questions. Critical thinking can also be enhanced through so-called conference style learning. Here the teacher does not give lectures but rather acts as a facilitator of a conference, he or she gives the students the task to thoroughly read certain materials and then discuss the materials in class asking each other questions. Although the teacher does not have the active role of a lecturer, he or she helps direct the discussion.

Some scholars see writing assignments in which one must defend both or more sides of an issue as a basic way to develop critical thinking skills in students. Other scholars advise teachers to produce much ambiguity in the classroom by giving students conflicting information, thereby making them think critically in order to find their way through.

Another good method to foster critical thinking is to stimulate discussions in the classroom. This can be done by asking students to read and analyze written dialogues in small groups, asking them to decide which viewpoint is the most

reasonable by looking presence or exclusion of important evidence, alternative interpretations, errors in facts and reasoning.

Promoting students' critical thinking, such as the ability to identify central issues in an argument, recognize important relationships, deduce conclusions from information or data provided, evaluate evidence, etc., has been an essential goal of higher education. Acquisition of CT skills is considered vital for students to face a multitude of challenges of adult life. However, despite the various attempts to make CT a primary focus of higher education, analyses of existing evidence indicates that the level of CT displayed by most students is inadequate. It is argued that classroom instruction is mostly inefficient to help students acquire thinking skills that they could apply to solve important problems in everyday life.

Domains of critical thinking

All that we do, we do on the basis of some motivations or reasons. But we rarely examine our motivations to see if they make sense. We rarely scrutinize our reasons critically to see if they are rationally justified. As consumers we sometimes buy things impulsively and uncritically, without stopping to determine whether we really need what we are inclined to buy or whether we can afford it or whether it's good for our health or whether the price is competitive. As parents we often respond to our children impulsively and uncritically, without stopping to determine whether our actions are consistent with how we want to act as parents or whether we are contributing to their self esteem or whether we are discouraging them from thinking or from taking responsibility for their own behaviour.

As citizens, we often vote impulsively and uncritically, without taking the time to familiarize ourselves with the relevant issues and positions, without thinking about the long-run implications of what is being proposed, without paying attention to how politicians manipulate us by flattery or vague and empty promises. As friends, we often get involved with people who stimulate us to act in ways that we have been trying to change. As husbands or wives, we often think only of our own desires and points of view, uncritically ignoring the needs and perspectives of our mates, assuming that what we want and what we think is clearly justified and true, and that when they disagree with us they are being unreasonable and unfair.

As patients, we often allow ourselves to become passive and uncritical in our health care, not establishing good habits of eating and exercise, not questioning what our doctor says, not designing or following good plans for our own wellness. As teachers, we often allow ourselves to uncritically teach as we have been taught, giving assignments that students can mindlessly do, inadvertently discouraging their initiative and independence, missing opportunities to cultivate their self-discipline and thoughtfulness.

Importance of critical thinking

Critical thinking is made for a specific purpose. It is not only thinking about making judgments and solving problems, but also the use of certain skills and strategies to achieve a specific purpose. Critical thinking uses concepts to analyze and evaluate thinking. It is never perfect and complete. Thinking is part of the human nature, based on the individual's experience. Excellence in thinking, however, could be achieved with hard work and long practice.

The word critical suggests that the process involves evaluation, or "a reflection of positive and negative attributes." Critical thinking enables individuals to assess the outcome of the process of thinking. At the same time, this process involves evaluation of the thinking process itself. Critical thinking helps individuals improve the quality of their lives and makes them more rational and reasonable.

Critical thinking sets goals, makes assumptions, assesses evidence and conclusions. It has numerous positive uses. For example, critical thinking can help solve a problem or help an individual decide what to do, how to act in certain circumstances or what to believe. Reading, writing and speaking can also be made in a critical way. Reasoning is generally made to achieve a certain goal. This goal has to be set clearly and has to be distinguished from similar purposes.

Thinking usually tries to solve a problem or to answer a question. To do this an individual needs to gather information. After collecting data, facts and evidence an individual starts interpreting them and making conclusions. Based on these conclusions, the individual forms theories, concepts and definitions. He or she uses certain assumptions and reaches specific consequences.

The common denominators of critical thinking are the most important by-products of the history of critical thinking. Critical thinking requires the systematic monitoring of thought; that thinking, to be critical, must not be accepted at face value but

must be analyzed and assessed for its clarity, accuracy and relevance. Critical thinking, by its very nature, requires that all reasoning proceeds from some goals and objectives; that all data when used in reasoning must be interpreted.

Our basic concept of critical thinking is simple. We could define it as the art of taking charge of our own mind. If we can take charge of our own minds, we can take charge of our lives; we can improve them, bringing them under our self command. Of course, this requires that we learn self-discipline and the art of self-examination. This involves becoming interested in how our minds work, how we can monitor and modify our operations for the better. It involves getting into the habit of examining our impulsive and accustomed ways of thinking and acting in of our lives.

It is quite possible and, unfortunately, quite "natural" to live an unexamined life; to live in a more or less automated, uncritical way. It is possible to live, in other words, without really taking charge of the persons we are becoming; without developing or acting upon the skills and insights we are capable of. However, if we allow ourselves to become unreflective persons we are likely to miss many opportunities to make our own lives, and the lives of others happier, and more productive.

Critical thinking is a way of going about living and learning that empowers us and our students in quite practical ways. When taken seriously, it can transform every dimension of school life: how we formulate and promulgate rules; how we relate to our students; how we encourage them to relate to each other; how we cultivate their reading, writing, speaking, and listening.

We are likely to make critical thinking a basic value in school insofar as we make it a basic value in our own lives. Therefore, to foster critical thinking, we must become committed to thinking critically and reflectively about our own lives and the lives of those around us. We must become active practitioners of critical thought. We must regularly model for our students what it is to examine, critically assess, and effectively improve the way we live.

Conclusions

We might define critical thinking as thinking that aims at well-founded judgment, utilizing appropriate evaluative standards to determine the true worth, or value of something. Research into critical thinking reflects the common perception that human thinking left to itself often gravitates toward prejudice, generalizations, rigidity and narrowness.

Critical thinking seeks ways of understanding the mind and then training the intellect so that "errors", and "distortions" of thought are minimized. It assumes that the capacity of humans for good reasoning can be nurtured and developed by an educational process aimed directly at that end.

A critical thinker raises questions of vital importance and formulates them in a clear and precise manner. A critical thinker gathers relative information, which is then assessed and interpreted in order to reach conclusions and solutions. These conclusions should be tested, using relevant criteria and standards. A critical thinker thinks in an open-minded way and communicates effectively with others.

A critical thinker:

Raises vital questions and problems, formulating them clearly and precisely

Gathers and assesses relevant information, using abstract ideas to interpret it effectively

Comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards

Thinks open-mindedly, recognizing and assessing, as needs be, their assumptions, implications, and consequences.

Communicates effectively with others in figuring out solutions to complex problems.

The result of the contribution of the history of critical thought is that the basic questions can now be much more powerfully framed and used. In every domain of human thought it is now possible to question:

ends and objectives,

the sources of information and fact,

the method and quality of information

the mode of judgment and reasoning used,

the concepts that make that reasoning possible,

To sum up, the tools and resources of the critical thinker have been vastly increased in virtue of the history of critical thought. Hundreds of thinkers have contributed to its development. Each major discipline has made some contribution to critical thought.

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