

Critical Thinking Solving everyday problems by Critical Thinking

التفكير النقدي

حل المشكلات اليومية بالتفكير النقدي

* **Mohammed Madian**

mohamedmadin79@gmail.com

Abstract:

Critical thinking refers to the ability to analyse information objectively and make reasoned judgments. It involves the evaluation of data, facts, observable phenomena.

Critical thinking is the ability to think clearly and rational about what to do or what to believe.

Critical thinking enhances language, communication, and presentation skills and promotes creativity and it is crucial for self-realization, and self-reflection.

Good critical thinks can understand the logical connections between ideas, identify, construct and evaluate argument, detect inconsistencies and common fallacies in reasoning solve everyday problems systematically, reflect on the justification of one's own values.

On a personal note, I hope that this research will inspire you, dear reader, to raise your commitment to values and ethics of critical thinking to a summit of its own.

Keywords: Critical thinking (CT), Everyday life (9) strategies, common misconceptions of (CT), Barriers to (CT), socio-centricity as obstacle to (CT), dispositions of (CT), how to value an argument (37) standards, inference, interpretation.

* **Professor of Philosophy - Faculty of Arts - Cairo University.**

ملخص:

التفكير الناقد هو القدرة على تحليل المعلومات على نحو منهجي سديد، كما أنه يقوم بإصدار الأحكام المنطقية والمعقولة. وهذا التفكير يتضمن تقييم الوقائع والحقائق والظواهر التي يمكننا ملاحظتها.

فالتفكير الناقد هو، في جوهره، القدرة على التفكير الواضح والعقلاني فيما نقوم به من أفعال وما نعتقد.

وهذا التفكير يمكنه فهم العلاقات المنطقية بين الأفكار، وتحديد وبناء وتقييم الحجج، كما يمكنه تتبع صور عدم الاتساق والمغالطات الشائعة التي تعوق الاستدلال الصحيح، بالإضافة إلى أن هذا التفكير يُساعد في حل المشكلات اليومية بصورة منهجية، كما أنه ينهض بتسوية قيم المرء ومعتقداته سواء على المستوى الشخصي أو الاجتماعي.

وعلى المستوى الشخصي، فأمني أمل أن يُلهم هذا البحث القارئ العزيز بالالتزام بقيم وأخلاق هذا التفكير، وأن يصل بهذا الالتزام إلى ذروته وقمته.

الكلمات المفتاحية: التفكير النقدي (CT)، الحياة اليومية (9) استراتيجيات، المفاهيم الخاطئة الشائعة ل (CT)، العوائق لـ (CT)، المركزية الاجتماعية كعقبة أمام (CT)، معايير (CT)، كيفية تقييم الحجة (37) المعايير، الاستدلال، التفسير.

(1)

European Historical Background

Socrates (ca. 479-399 B.C.)

Socrates is an important thinker in intellectual history because of his emphasis on clarity in thought, on intellectual integrity, and on living an examined life. The life of Socrates offers two key contributions to critical thinking theory. The first is the need to live a virtuous and ethical life, which requires an explication of some obstacles to thinking well. The second is the method of questioning he continually exhibited and encouraged others to emulate. The Socratic Method was used by Socrates as the primary method for living an ethical life. Through skilled questioning, Socrates helped people see inconsistencies and assumptions inherent in their beliefs and reasoning. These important concepts are summarized by Plato, through the Socratic principles “the unexamined life is not worth living.” To this end, Socrates makes an important early contribution to a substantive conception of critical thinking.

One barrier to high quality thought, as Socrates viewed it, was that often “people could not rationally justify their confident claims to knowledge,” and such inconsistencies often led to the tendency to compromise ethical and virtuous values. He developed and practiced a method of questioning intended to probe deeper into one’s claims so as to illuminate any logical inconsistencies that may exist. Socrates’ questioning technique “led students beyond speculation and belief to understanding and knowledge”. In doing so, Socrates emphasized the standards of thinking clearly and consistently. He also exemplified the power of constructing organized and directed questions to facilitate critical thought. The Socratic Method is directly applicable to modern education across disciplines and has been for centuries, but just as every intellectual shines as a result of his historical context, so too did the cultural and social climate of classical Greece provide this opportunity for Socrates.

Francis Bacon (1561-1626)

The intellectual tradition on which critical thinking is predicated is also found in the work of Francis Bacon. At the heart of his contribution lies his insistence that people must question their assumptions, both personal and cultural. Bacon’s examination of personal presuppositions

led him to articulate psychological barriers to thinking well: Distempers of learning and the four idols. His assessment of the cultural and intellectual assumptions of his time, primarily that of unquestionably accepting Aristotelian deductive logic, moved him to articulate the conceptual foundations of the modern scientific method; a system of thinking dedicated to the discovery of new knowledge and based on an explicit process that is purposeful, measurable, and verifiable. Bacon identified general obstacles to thinking critically and developed the framework for a method to monitor these obstacles when thinking through a problem or issue. His insistence on questioning the presuppositions that claimed to define knowledge and that which constitutes clear thinking led him to emphasize the fact that to know an idea well is to know its opposite well. Bacon's articulation of the four idols of truth firmly establishes him as a significant contributor to the intellectual tradition of critical thinking.

The first obstacle to thinking well is the Idol of the Tribe. The tribe represents the human race, and the traits that characterize it as such. Fallacious thinking is often a result of the human tendency to presuppose one's senses and thinking are correct, and thus ignore evidence when it does not conform to one's preconceived notions of reality, values, or interests. Bacon writes that "the mind of man is far from the nature of a clear and equal glass, wherein the beams of things should reflect according to their true incidence; nay, it is rather like an enchanted glass, full of superstition and imposture, if it be not delivered and reduced". Bacon correctly believed that, all too often, quality reasoning is compromised due to the innate tendency to overlook the natural limitations of one's senses. The Idol of the Tribe is a metaphor to remind people that quality reasoning is based on verifiable evidence; where judgments about the world and reality need to be well founded, rather than based on mere subjective experience.

The second obstacle to thinking critically is the Idol of the Cave. In addition to overreliance on their physical senses, humans have the tendency to act selfishly. They do not consider problems that affect the whole society, but focus on those that affect one's personal life. Drawing from Plato's allegory of the cave, Bacon uses the Idol of the Cave as a metaphor for expressing the erroneous tendency to accept as truth one's perceptions of reality as well as the beliefs of one's culture. He introduces this idea in The Advancement of Learning stating that,

“Our spirits are included in the caves of our own complexions and customs, which minister unto us infinite errors and vain opinions, if they be not recalled to examination”. Bacon reiterates this point in *The New Organon* writing that “everyone has a cave or den of his own, which refracts and discolors the light of nature”. People see the world from a certain point of view. This limited perspective filters what one sees, reads, gathers in discussion, etc. The unfortunate consequence is that every individual human mind “is in fact a thing variable and full of perturbation, and governed as it were by chance.” Substantive learning, substantive understanding, and the substantive advancement of learning cannot be subject to mere chance; one must be mindful of the various tendencies that promote poor thinking and critically confront them in such a way that one’s thinking experiences greater clarity and insight. Bacon’s hope is to “let every student of nature take this as a rule: that whatever his mind seizes and dwells upon with peculiar satisfaction is to be held in suspicion”. Through the concept of the *Idol of the Cave* Bacon calls for the need for fair-mindedness and intellectual humility, both of which are essential in a substantive conception of critical thinking.

The *Idol of the Marketplace* represents the misuse of language. It represents Bacon’s concern that unclear language is one of the primary causes of unclear thinking; reciprocally, to use language clearly will help one think more clearly. “Because words govern reason [and] reason governs words,” unclear, inaccurate, and generally undisciplined language reflects unclear reasoning. Using the concept of clarity as an organizing standard, Bacon argues that an “ill and unfit choice of words wonderfully obstructs” understanding, not only in daily social conversations, but also in scholastic circles. He writes in *The New Organon* that men are all too often prone to over specialization; the negative consequence of which is to distort analyses across disciplines. Bacon argues that the clear and precise use of language exposes specialized use that is often fraught with fallacious assumptions about knowledge and the natural world. The *Idol of the Marketplace* is another important metaphor in the history of critical thinking because it illuminates the need for clarity in thought.

The fourth obstacle to thinking critically is the *Idol of the Theatre* where one’s mind is guided by accepted and often irrational or blindly accepted traditions. To uncritically accept the authority and validity of

an established tradition is to accept its errors and shortcomings. Furthermore, according to Bacon, uncritical acceptance based on the word or position of authority is a barrier to sound reasoning. The idol of the theatre is Bacon's own critique of the authoritarian world in which he found himself. It is also his critique of those who hold beliefs out of superstition.

John Dewey

Dewey may be recognized as the first American educator in his book *How We Think*, he discussed how the development of an individual capable of reflective thinking should be a prominent educational objective. From his work, we understand that thought is grounded in a pragmatic basis of purposes, goals, and objectives. Dewey suggested education should provide an increase in the range and complexity of situation to which the child is capable of applying reasoned inquiry. Dewey referred to his position as "experimentalism" philosophy, which, when applied to education, became known as progressive education.

Dewey believed education should be the instrument of social reform. Because industrialization displaced the family as the major economic center, Dewey believed industrialization was the cause of many of society's problems, and that the school must assume the educational functions formerly met by home and community.

Dewey believed education should be the instrument of social reform. Because industrialization displaced the family as the major economic center, Dewey believed industrialization was the cause of many of society's problems, and that the school must assume the educational functions formerly met by home and community.

Dewey also believed the school was responsible for the development of informed citizens who could participate intelligently in a democratic, technological society and that the school must become a miniature community in which the exchange of ideas becomes possible.

Whether influenced by Dewey or not, in 1937 the National Education Association's Educational Policies Commission included the following statement among its list of 10 imperatives: "All youth need to grow in their ability to think rationally to express their thoughts clearly and to read and listen with understanding".

Human mental life as composed of both mental states and

movements with connections between each type. In his view, connections between ideas accorited for the major portion of "knowledge" in its popular sense. The process of learning, in other words, is simply that of connecting: "The mind is man's is man's connections system".

Edward Glaser who is considered the father of the modern critical thinking movement, defined critical thinking as follows: "The ability to think critically... involves three things:

(1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill in applying those methods" Glaser's conception, in part, introduces as a necessary condition the concept of intellectual dispositions, where one exercises a willingness to open-mindedly investigate problems and issues relevant to one's life. Like Dewey, Glaser emphasizes the need to think with well founded reasons rather than thinking that is directed, for example, by bias, subjective opinion, and/or social conformity.

Robert Ennis' definition is one of the most cited because, in part, it explicates the practical nature and goals of thinking critically. He writes, "Critical thinking is a process, the goal of which is to make reasonable decisions about what to believe and what to do". Ennis points out that critical thinking is not a thing or a goal in and of itself; rather, it is a process of making informed decisions that affects the way one lives his/her life, the ultimate goal of which is to live reasonably in the strong or ethical sense of the term. It is based on a practical examination of one's beliefs and actions as a guide for living an examined life.

In this vein, Paul, Elder and Bartell write that critical thinking is "the intellectually disciplined process of actively and skillfully conceptualizing, applying, synthesizing, and evaluating information gathered from or generated by observation, reflection, reasoning, or communication, as a guide to belief and action". Beyond that of explicating specific analytical processes, the idea that critical thinking is a practical endeavor, and the fact that thinking critically requires rigorous intellectual work, Paul, Elder and Bartell emphasize the conceptual nature of thinking. All thinking relies on ideas and the extent to which one has command of the way s/he is using an idea will

reflect the extent to which one's thinking is of the highest quality.

Matthew Lipman defines critical thinking as “skillful and responsible thinking that :

- (1) facilitates judgment because it,
- (2) relies on criteria,
- (3) is self-correcting, and
- (4) is sensitive to context”.

Lipman, whose definition is highly visible within the discourse, not only emphasizes the need for criteria in evaluating reasoning, but points out that one who thinks well is sensitive to context. For example, a good thinker is one who understands that evaluative criteria, such as accuracy, clarity, and relevance, are always present, but the context determines the extent to which any particular standard requires greater emphasis than another. Furthermore, thinking of the highest quality is skillful in that it takes regular practice to develop. Skillful thinking is not to be confused with innate skill or ability to perform a task. Although it is human nature to think with reason, high quality thinking requires development. This is the essence of what it means to think skillfully and reasonably.

Richard Paul speaks to the need for meta-cognition in the act of thinking critically stating that, “Critical thinking is thinking about your thinking, while you're thinking, in order to make your thinking better.” This rather catchy interpretation summarizes the general goal of what it means to think critically: to raise thinking to a higher, more sophisticated level. In other words, the goal of thinking critically is to become more rational in the sense that one is aware of and, to the extent it is possible, in control of one's decisions and beliefs with sensitivity to relevant ethical implications. The inherent assumption is that “the quality of our life and that of what we produce, make, or build depends precisely 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”. In order for one to improve the quality of his/her thinking in any given context requires meta-cognitive reflection followed by disciplined action.

Bertrand Russell's 10 Essential Rules Of Critical Thinking

Perhaps the essence of the Liberal outlook could be summed up in a new decalogue, not intended to replace the old one but only to supplement it. The Ten Commandments that, as a teacher, I should wish to promulgate, might be set forth as follows:

1. Do not feel absolutely certain of anything.
2. Do not think it worth while to proceed by concealing evidence, for the evidence is sure to come to light.
3. Never try to discourage thinking for you are sure to succeed.
4. When you meet with opposition, even if it should be from your husband or your children, endeavor to overcome it by argument and not by authority, for a victory dependent upon authority is unreal and illusory.
5. Have no respect for the authority of others, for there are always contrary authorities to be found.
6. Do not use power to suppress opinions you think pernicious, for if you do the opinions will suppress you.
7. Do not fear to be eccentric in opinion, for every opinion now accepted was once eccentric.
8. Find more pleasure in intelligent dissent than in passive agreement, for, if you value intelligence as you should, the former implies a deeper agreement than the latter.
9. Be scrupulously truthful, even if the truth is inconvenient, for it is more inconvenient when you try to conceal it.
10. Do not feel envious of the happiness of those who live in a fool's paradise, for only a fool will think that it is happiness.

(2)

Critical thinking Movement : 3 waves

First wave research concerns:

- The design of individual courses in critical thinking or informal logic.
- The critique of formal logic as a tool for the analysis and assessment of "real world" reasoning and argumentation
- The development of theories of fallacies in thought

- The development of theories of informal logic, reasoning, persuasion, rhetoric, and argumentation, etc.
- The exploration of philosophical issues raised by theories developed to account for informal logic, reasoning, and argumentation.

In the first wave of critical thinking practice, the dominant paradigm came from philosophy and logic and the dominant educational manifestation was a formal or informal logic course. The idea was to establish a basic course in critical thinking which would provide entering freshmen with the foundational intellectual skills they need to be successful in college work. Almost from the beginning, however, there was a contradiction between the concern and ideals that gave rise to the theory and practice and actual classroom practice. The ideals were broad and ambitious. The practice was narrow and of limited success. For example, the State college and University system of California defined the goals of the critical thinking graduation requirement as follows:

Instruction in critical thinking is to be designed to achieve an understanding of the relationship of language to logic which should lead to the ability to analyze, criticize, and advocate ideas, to reason inductively and deductively, and to reach factual or judgmental conclusions based on sound inferences drawn from unambiguous statements of knowledge or belief. The minimal competence to be expected at the successful conclusion of instruction in critical thinking should be the ability to distinguish fact from judgment, belief from knowledge, and skills in elementary inductive and deductive processes including and understanding of the formal and informal fallacies of language and thought.

On the one hand, we have a global comprehensive goal and on the other hand a fairly narrow and specialized way to meet that goal. Students do not in my experience achieve "an understanding of the relationship of language to logic" leading to "the ability to analyze, criticize, and advocate ideas"; they do not develop "the ability to distinguish fact from judgment" or "belief from knowledge" simply because they have been drilled in "elementary inductive and deductive processes" nor because they have been exposed to the theory of formal and informal fallacies.

The misfit between goal and means is obvious to anyone who

takes the goals in the above paragraph seriously. On three unit course in critical thinking can at best open the door to the beginning of critical thinking, provide an opening framework, It cannot result in the students having deep notions like " an understanding of the relationship of language to logic" or sweeping abilities like "the ability to analyze, criticize, and advocate ideas".

No one or two isolated courses can change the basic of thought of anyone. Furthermore, as a practical matter, many of the courses established to accomplish the objective fell far short of the best design, Often, for example, a course in formal logic was allowed to qualify as a course in critical thinking even though such courses generally are confined to teaching only the mechanical manipulation of symbols in accord with rules for such manipulation, a practice that does not result in changing habits of thought. Students who have taken such courses demonstrate little sense of how to transfer their "manipulative" abilities (with the symbols of formal logic) into practical tools in everyday thought.

Substituting informal logic courses for formal ones was one of the earliest shifts in emphasis as more and more instructors recognized that the formal logic approach had little transfer effect. The emphasis in the informal logic approach to the improvement of thinking was a giant step in the right direction. In place of highly abstract and contrived "arguments" in symbolic form, the students had to read and analyze arguments that came from editorials and every day speech and debate.

Unfortunately, the informal logic textbooks were often rich in vocabulary and sophisticated distinctions but, unfortunately, poor in fostering deep internalization. The distinctions were generally well thought out, but there were far too many distinctions for a one semester course, and furthermore, they were typically too narrow in their scope. Consequently, most students were rushed on to new distinction and concepts before they had internalized the "old" ones. There was little emphasis on the construction- as against the critique- of reasoning. There was little done with the essential dispositions and values underlying critical thinking. The goals remained broad and profound; the means narrow and unrealistic.

Furthermore, the problem of transfer remained; it was still not clear to students how to transfer their analysis of bits and pieces of argumentation into learning what they were being taught in other

courses, namely, sociology, psychology, biology, etc. So most students, once their critical thinking courses were finished, recerted to their established lower- order, survival skills- principally, rote memorization and cramming- to get by.

The problem of most first wave work is/both theoretical and pedagogical. Theoretically, little if anything was done to work out a comprehensive theory of "logic" sufficient to make sense of the logi of biology, the logic of sociology, the logic of anthropology, geography, literature, the arte, etc. The concept of logic implicit in informal logic research is too narrow to provide the basis for transfer of critical thinking from, in fact, informal logic courses (no matter how well designed) to the broader curriculum, nor into the complex problems of everyday life and thought (except in a narrow range of such problems).

Pedagogically, little was done to work out the practical problems of restructuring instruction and learning overall. After all, how is one to teach anyone anything in such a way as to foster their taking command of their thinking, that they develop not only intellectual skills but the basic dispositions and values that underlie critical thinking? How are academic subjects to be taught such that students leave school with the intellectual skills necessary to adapt to incessant and accelerating change and complexity? How are we to teach so that astudents explicitly recognize that the work of the future is the work of the mind, intellectual work that demands global skills of reasoning and intellectual self- discipline? These questions must be addressed.

The scoend wave of critical thinking research & Practice 1980-1993

Critical Thinking Across the Curriculum Across the Grades

Second Wave Research concerns:

- The development of a model for teaching critical thinking at some educational level or within some particular subject
- Exploration of the relation of critical thinking to emotion
- Exploration of the relation of critical thinking to the media
- Exploration of the relation of critical thinking to problem-solving
- Exploration of the relation of critical thinking to creative thinking
- Exploration of the relation of critical thinking to creative

thinking

- Exploration of the relation of critical thinking to sound business organization and management
- Exploration of the relation of critical thinking to parenting
- Exploration of the relation of critical thinking to political and ideological agendas.
- Research in cognitive psychology.

The second wave of critical thinking research and practice began when increasing numbers of educators and administrators began to recognize that one course in critical thinking at the college level does not a critical thinker make. The problem for these reformers was transformed from "How should one design an isolated critical thinking course for college students?" to "How can critical thinking be integrated into instruction across all subjects and all grade levels?" From "What is informal logic, reasoning, and argumentation?" to "What is the role of emotion- or intuition or culture or gender or problem solving or creative thinking or political and ideological positioning- in thinking?"

Unfortunately, many second wave reformers were not at all clear on how to integrate critical thinking into instruction across the curriculum or across grade levels. The concept of informal logic which had been developed in and for critical thinking and informal logic courses did not translate readily into the "logic" of the disciplines, let alone into the "logic" of everyday life. For though informal logicians were often clear and rigorous in the development of theory, the theory they developed was narrowly conceived. In other words, most informal logicians have never seriously considered the challenge of developing a theory of critical thinking adequate for the teaching of all subjects across all grade levels. Informal logic was not conceived as applicable to virtually all human contexts. The theory of the informal logician remained the theory of a specialist thinking and writing for other specialists (about a subject of relatively narrow scope). It was not the thinking of a comprehensive educational thinker writing for educational reformers. It was not the thinking of a comprehensive mind considering broad and comprehensive problems.

From a third wave perspective, and adequate account of informal logic and critical thinking must shed significant light on the logic of everyday thinking as well as on the logic of the disciplines (if it is to

attract the attention of educational reformers and those concerned with the application of critical thinking to everyday life). Problems in business, parenting, everyday relationships, politics, civics, and such, cannot easily be addressed within the framework of current theories of logic. And since critical thinking makes sense whenever and wherever thinking might go awry, the logic of critical thinking must be broad and encompassing, not narrow and specialized.

Unfortunately, second wave reformers did not set out to broaden the basis of informal logic and reasoning. Rather, some second wave reformers mistakenly rejected "logic" rather than worked to expand it. To some, logic constrained thinking, limited creativity, discounted intuition. Others seemed simply to ignore logic and focused instead on any of the various "discoveries" and popular theories of thinking. In fact, the field of "thinking" became, and still is, a veritable hodge-podge, some work bordering on charlatanism. Quick-fixes for teaching and understanding thinking became commonplace. Quick-fixes for teaching and understanding thinking became commonplace. Quick-fixes ruled, and still rule, reform efforts at all educational levels.

Otherwise respectable educational organizations sponsored approaches to thinking that were simplistic and glitzy. Big money began to move into the field, since there was much money to be made by quick-fix programs that implied that thinking could be quickly and painlessly upgraded by educators, even by those who had never themselves studied thinking and thought poorly themselves. Instant success was promised.

The phenomena of pseudo-critical thinking became common. States set up new testing strategies that were claimed to be higher order. California mounted a very expensive new testing system in reading and writing which was touted to be focused on critical thinking-when it in fact was simply subjective and poorly designed. The result was a political battle between the "liberals" who liked the test and "conservatives" who thought it advanced a liberal agenda. Eventually the governor vetoed the test.

Other second wave researchers- principally cognitive psychologists- have focused concern on the manner in which experts and novices think. They have developed various theories of "thinking" and "intelligence", however, this research and these theories often lack a philosophical foundation, regularly ignore the problem of the

intellectual assessment of thinking, and , like first wave informal logic research, lack a clear connection to the comprehensive problem of teaching subject matter in a variety of fields. The "practical" suggestions developed were more often like a bag of tricks than a coherent pedagogy. The problem of long-term infusion was not significantly addressed.

Though second wave did not explicitly call for an abandonment of "logic" and additional attention was directed at explicating various subject areas in the light of some theory of critical thinking, there was little effort to marry the insights of the first wave with the needs of the second.

Little was done, for example, to explicate the logic of history, the logic of math, bio-logic, socio-logic, psycho-logic, the logic implicit in disciplined ways of thinking. After all, what does it mean to think historically, to think geographically, to think mathematically, to think philosophically, to think aesthetically, etc.? These are pressing second wave questions. However, since most subject matter specialists have not studied informal or formal logic, they are not well-positioned to integrate insights from logic into their concept of their field.

In short, the variety of attempts to reconstruct (with little background in informal logic or theory of critical thinking) the role of critical thinking within a domain, has tended to result in disjointed and sometimes superficial results. The upshot is often a hodge-podge of ideas, often superficial, usually incomplete, and in some cases, arbitrary. The phenomenon of instant-expert in critical thinking becomes commonplace.

Those who decide to write an article on critical thinking become in their minds an expert overnight. Programs are rushed into press to capitalize on the emerging market for critical thinking materials.

The Third Wave of Critical Thinking Research & Practice 1990-Present:

Third Wave Research Concerns:

- Integrating the insights of first and second wave research
- Developing a theory of critical thinking that is rigorous and comprehensive
- Explicating intellectual standards that have general application both within and beyond academic environments

- Accounting for the appropriate role of emotion and values in thinking
- Understanding the leading role of thinking in the shaping of emotion and behavior
- Integrating the empirical work of cognitive psychology into critical thinking theory
- Establishing common denominator principles and standards within the field of critical thinking research and practice.
- Developing effective assessment tools
- Identifying and critiquing pseudo-critical thinking models and programs.

The third wave of critical thinking research and practice is only just now beginning to emerge. As yet there are few who see clearly the enormity of the task which the field faces. The success of the third wave can be achieved only with a growing recognition of the strengths and weaknesses of the first two ELEM. First wave research needs to bring its rigor and depth into a broader complex of concerns. Second wave research needs to integrate rigor and depth into its comprehensiveness. Theory of teaching and learning (based on theory of thinking, emotion, and action) need to be carefully integrated.

The field needs a comprehensive theory of thinking and critical thinking. It needs a clear set of intellectual standards. It needs an integrated set of dispositions. It needs a comprehensive concept of logic which accommodates the role of emotion, intuition, imagination, and values in thinking. It needs to make clear the leading role of thinking in the shaping of human feelings and behavior. It needs to provide a framework into which can be set integrated theories of teaching and learning in the widest variety of human contexts. It must provide both for the universal elements in reasoning and those which are domain and context-specific.

(3)

What is critical thinking?

Critical thinking is the ability to think clearly and rationally about what to do or what to believe. It includes the ability to engage in reflective and independent thinking. Someone with critical thinking skills is able to do the following :

- understand the logical connections between ideas

- identify, construct and evaluate arguments
- detect inconsistencies and common mistakes in reasoning
- solve problems systematically
- identify the relevance and importance of ideas
- reflect on the justification of one's own beliefs and values

Critical thinking is not a matter of accumulating information. A person with a good memory and who knows a lot of facts is not necessarily good at critical thinking. A critical thinker is able to deduce consequences from what he knows, and he knows how to make use of information to solve problems, and to seek relevant sources of information to inform himself.

Critical thinking should not be confused with being argumentative or being critical of other people. Although critical thinking skills can be used in exposing fallacies and bad reasoning, critical thinking can also play an important role in cooperative reasoning and constructive tasks. Critical thinking can help us acquire knowledge, improve our theories, and strengthen arguments. We can use critical thinking to enhance work processes and improve social institutions.

Some people believe that critical thinking hinders creativity because it requires following the rules of logic and rationality, but creativity might require breaking rules. This is a misconception. Critical thinking is quite compatible with thinking "out-of-the-box", challenging consensus and pursuing less popular approaches. If anything, critical thinking is an essential part of creativity because we need critical thinking to evaluate and improve our creative ideas.

Why is critical thinking important?

Critical thinking is important because it is the ability to rationalize ideas, opinions and thought, and make logical decisions. Being able to critically think will lead to a much better life as you will have the ability to make right decisions and question everything.

How I develop my confidence among the people?

Community Answer

Practice! Keep having conversations that display your critical thinking skills.

How can I be assured answers?

Community Answer

Practical keep having conversations that display your crucial thinking skills.

How can I be assured about answers?

Community Answer

By doing as it says in the article above—don't just accept answers as correct. Check for yourself, check from several sources until you are happy with the conclusion you finally rest upon.

What is the overall best way to improve critical thinking?

Community Answer

Critical thinking is evaluating what you hear and read. It helps to explore the motive of the information. You learn through research, asking questions, and not assuming you're right.

How do I use critical thinking on close relatives ?

Community Answer

Question all your assumptions about them, and don't accept information uncritically... investigate for yourself whether things you are told are true.

When someone tells me their idea I just listen and nod without thinking about it. How can I change that?

Community Answer

You could actually listen and ask questions if you're curious about something they said.

How to I know if something is right or wrong?

Community Answer

From a set of permanent facts/rules. If someone asks you a question, always give a form of response. If you know the answer then give the answer. If you don't then say you don't, or if it's a personal question you can simply say you'd prefer not to say.

(4)

The Standard of Questions You Should Ask

Although the actual questions will be very important to critical thinking, the emphasis and purpose of these questions will determine how effective the questions will be. You must first know how to

question before you know what and which critical thinking questions to ask.

1. Open-ended questioning

As a critical thinker, you cannot allow whomever or whatever you are questioning to give you the smallest amount of information for your questions. Yes or No answers can really drag out the process of getting the answers and information that you want.

Asking questions that will not only give you the answers you are looking for but also open up a heap more information than you were searching for. Ask open-ended questions such as the following:

- “What is the purpose of this scenario?” **Instead of:** “Is this the purpose of this scenario?”
- “What is your favorite thing about this scenario?” **Instead of:** “Is this your favorite thing about this scenario?”

2. Avoid leading questions

Being a critical thinker is about escaping your bias and seeing things outside of your personal perspective. It is thus very important to avoid leading the question, in an area you want it to go.

Keep your questions as neutral as possible and don't allow any definitive language to creep into the question. Such as using the following:

- “What is your take on the healthiest diet there is?” Instead of: “Don't you think the vegan diet is the healthiest diet?”
- “What is the condition of the country at the moment?” Instead of: “How bad is the condition of the country at the moment?”

3. Specify the boundaries of your questions

As much as leading a question can be a hindrance to what you want, so can leaving the question too open, and invite unnecessary information to be given. Critical thinking is about being objective, but it still needs a direction and focus in which you apply your critical thinking.

Make sure that you set up an accurate framework in which your questions can be answered. Being too broad makes the process of getting answers inefficient and drawn out. Try asking questions like:

- “Who is your favorite male tennis player in the United States?” Instead of: “Who is your favorite tennis player?”

- “If you could live anywhere in South East Asia, where would that be?” Instead of: “If you could live anywhere, where would that be?”

4. Funnel the questions until you get the answer you were looking for When questions remain shallow, it is easy for the sources of information you are questioning to mislead and avoid giving you the information that you want.

Do not set up the path of questions beforehand, but rather make sure that you dig deeper after each question in the direction of information that you really want. Once you have your answer, then move back to broader questioning in order to get a better picture of the whole once again.

5. All the answers to your question must be based on facts and well supported from many different sources

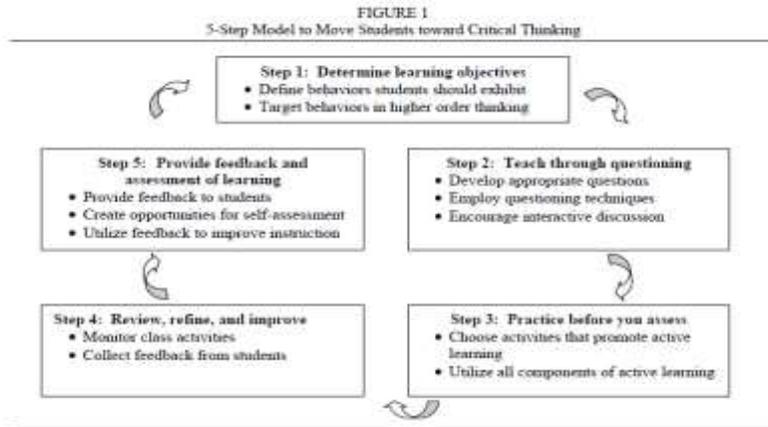
Make sure that you don't give into hearsay. Find the studies, the science, and ample testimonials before you accept the information that you have been given.

Look into many different and unrelated sources to see if the information matches up. Look at the other side of the argument and validate their claims.

Techniques That Encourage Critical Thinking

5-Step Model to Move Students Toward Critical Thinking

Step 1. Determine learning objectives. Considering the importance of a course, its placement in a program of study, and its role in providing a base of knowledge to be built upon by other courses, a teacher should first identify the key learning objectives that define what behaviors students should exhibit when they exit the class. To make critical thinking happen, these learning objectives, as well as the activities and assessments, must include those tied to the higher levels of Bloom's (1956) taxonomy.



Thus, a well-written lesson plan should target a specific behavior, introduce and allow for practice of the desired behavior, and end with the learner exhibition of the behavioral response. The development of well-written questions will greatly accelerate a learner's movement into critical thinking.

Consider computer security as an example. Say that the objective is: “Students will be able to classify common security threats by category.” The verb *classify* is a behavior typically identified with the *Analysis* level of Bloom’s taxonomy. The three categories (natural disasters, employee errors, crime) would be presented to the students using questions to enhance the students’ understanding. These questions could include (a) “What natural disasters are common in the area in which you currently live?” (b) “Are employee errors intentional acts?” and (c) “What computer crimes or acts of fraud have you read about in the past two months?” Once an understanding of the basic categories has been established, the students are placed in groups and assigned a business. Students will then be asked to identify at least three security threats from each category for that business to be shared in discussion with the entire class. Finally, students are asked individually to classify security threats by category for a business on the exam.

Step 2: Teach through questioning. Questioning is a vital part of the teaching and learning process. It allows the teacher to establish what is already known and then to extend beyond that to develop new ideas and understandings. Questions can be used to stimulate interaction between teacher and learner and to challenge the learner to defend his

or her position, (i.e., to think critically). Clasen and Bonk (1990) posited that although there are many strategies that can impact student thinking, it is teacher questions that have the greatest impact. He went on to indicate that the level of student thinking is directly proportional to the level of questions asked. When teachers plan, they must consider the purpose of each question and then develop the appropriate level and type of question to accomplish the purpose. All students need experience with higher level questioning once they become familiar with a concept. Thoughtful preparation on the part of the teacher is essential in providing that experience.

Questioning techniques can be used to foster the thinking ability of students. Questions can be categorized in a number of different ways. One simple method is to use the general categories of convergent and divergent questions. Convergent questions seek one or more very specific correct answers, while divergent questions seek a wide variety of correct answers. Convergent questions apply to Bloom's lower levels of *Knowledge*, *Comprehension*, and *Application* and may include questions like "Define nutrition,"

"Explain the concept of investing," and "Solve for the value of X." Divergent questions apply to Bloom's higher levels of *Analysis*, *Synthesis*, and *Evaluation*; are generally open-ended; and foster student-centered discussion, thereby encouraging critical thinking. For example, "Describe the qualities that make a person successful," "Create an office design to facilitate group interaction," and "Describe how sun spots might affect tree growth" are all divergent questions.

To most effectively encourage student participation, teachers must become highly skilled questioners. This is understandably difficult and takes commitment. According to *Teaching Strategies*, the crucial elements of a skilled questioner are that they: pose brief and concise questions, are prepared to rephrase questions, are prepared to draw further responses from participants, use a variety of techniques, redirect questions/responses, provide feedback and reinforcement without repeating answers, and spread questions around the class.

Elder and Paul proposed that the art of questioning is essential to the art of learning and that, to the extent that if they fail to ask genuine questions and seek answers to those questions, students are not likely taking the content seriously. Students learn math by asking questions about math, students learn history by asking questions about history,

and students learn business by asking questions about business. Teachers can and should use questioning techniques to inspire critical thinking in the classroom.

Step 3: Practice before you assess. In the past decade, a major shift has taken place in education; that shift is toward active learning. Teachers that have used this approach generally find that the students learn more and that the courses are more enjoyable. Bonwell and Eison described active learning as involving the students in activities that cause them to think about what they are doing. Fink indicated that the concept of active learning supports research which shows that students learn more and retain knowledge longer if they acquire it in an active rather than passive manner. To make learning more active, we need to learn how to enhance the overall learning experience by adding some kind of experiential learning and opportunities for reflective dialog.

According to Fink, there are two guiding principles that should be considered when choosing learning activities. First, activities should be chosen from each of the following three components of active learning: *Information and Ideas*, *Experience*, and *Reflective Dialog*. *Information and Ideas* include primary and secondary sources accessed in class, outside class, or online; *Experience* includes doing, observing, and simulations; *Reflective dialog* includes papers, portfolios, and journaling. Second, whenever possible, direct kinds of learning activities should be used. Examples of direct activities include doing in an authentic setting, direct observation of a phenomenon, reflective thinking, service learning, journaling, and dialog in or outside of class.

One very important ingredient of active learning is in-depth reflective dialog. This provides students with the opportunity to reflect on the meaning of their learning experience. One can reflect with oneself, as in a journal, or with others, as in a class discussion. According to Fink, in reflective writing, students should address the following questions: What am I learning? What is the value of what I am learning? How am I learning? What else do I need to learn?

When teachers think about what should happen in a course, it is important to consider the kinds of active learning that can encourage critical thinking. To enhance the overall learning experience and to create a complete set of learning activities, it is necessary to enlarge the view of active learning to include getting information and ideas, experience, reflection, and, when possible, direct experience.

Step 4: Review, refine, and improve. Teachers should strive to continually refine their courses to ensure that their instructional techniques are in fact helping students develop critical thinking skills. To accomplish this, teachers should monitor the classroom activities very closely. To track student participation, a teaching diary can be kept that identifies the students that participated, describes the main class activities, and provides an assessment of their success. Other reflective comments can also be tracked in this journal and can be very useful when revising or updating instructional activities.

Student feedback is also an important tool to be used in the improvement of a course. Angelo and Cross suggested numerous methods for collecting key information related to student learning and response to instructional techniques. One such method, the 2-minute paper, asks students to identify the most important point learned. Teachers can review the comments and use them in future classes to emphasize issues identified. Chain notes can be implemented with an envelope bearing a key question on it that students respond to by placing their answers in the envelope. Discussing the patterns of responses with the students can lead to better teaching and learning. Memory matrixes are also useful in the collection of student feedback; students are asked to fill in two-dimensional cells with labels related to a concept. For example, labels may correspond to different periods of history and students would be asked to classify events. The teacher can look for patterns among the incorrect responses and decide what might be the cause(s). These types of activities can also have positive benefits for the students. Students will become better monitors of their own learning. Students may find they need to alter study skills to improve their success in the course. Students will witness, firsthand, that the teacher cares about their learning.

Step 5: Provide feedback and assessment of learning. Teacher feedback, like assessment, compares criteria and standards to student performance in an effort to evaluate the quality of work. However, the purpose of feedback is to enhance the quality of student learning and performance, rather than to grade the performance, and, importantly, it has the potential to help students learn how to assess their own performance in the future. Feedback allows the teacher and student(s) to engage in dialogue about what distinguishes successful performance from unsuccessful performance as they discuss criteria and standards

Finally, it is important to note the importance of assessment to the 5-step model itself. Information gleaned from student feedback and assessment provides an immediate and significant source of information to the teacher with respect to which objectives were met, the effectiveness of specific learning activities, things to start or stop doing, effectiveness of feedback on standards, etc. This information should be used to continually improve courses and can in turn become a valuable part of a department or discipline's outcomes-based assessment efforts.

(5)

Critical Thinking—What Can It Be?

If schools are to succeed in teaching critical thinking, educators must have a clear idea of what it is: critical thinking relies upon criteria, is self-correcting, and is sensitive to context.

If we are to foster and strengthen critical thinking in schools and colleges, we need a clear conception of what it is and what it can be. We need to know its defining features, its characteristic outcomes, and the underlying conditions that make it possible.

The Outcomes of Critical Thinking Are Judgments

Let's begin with outcomes. If we consult current definitions of critical thinking, we cannot help being struck by the fact that the authors stress the outcomes of such thinking but generally fail to note its essential character is *tics*. What is more, they specify out-comes that are limited to solutions and decisions. Thus, one writer defines critical thinking as "the mental processes, strategies, and representations people use to solve problems, Make decisions, and learn new concepts.

Another conceives of critical thinking as 'reasonable reflective thinking that is focused on deciding what to believe and do'

These definitions provide insufficient enlightenment because the outcomes (solutions, decisions, concept acquisition) are too narrow, and the defining characteristics (reasonable, reflective) are too vague. For example, if critical thinking is thinking that results in decisions, then selecting a doctor by picking a name at random out of a phone book would count as critical thinking. We must broaden outcome, identify the defining character is *tics*, and then show the connection between them.

Our contemporary conception of education as inquiry combines two aims—the transmission Of knowledge and the cultivation of wisdom. But what is wisdom? Consulting a few dictionaries Will yield such phrases as "excellent "intelligent judgment.judgment." or "judgment tempered experience." But what is judgment Here again, recourse to dictionaries that judgment is 'the forming of opinions. estimates, or consult therefore includes such stons' things as solving problems, making decisions, and learning new concepts. but it is more inclusive and more general.

The line of inquiry we are taking shows wisdom to be the characteristic outcome of good judgment and good judgment to be the characteristic of critical thinking. Perhaps the point where we are now. where we want to know' how ordinary judgment and good judgment differ, is a good place to consider some illustrations.

Wherever knowledge and experience are not merely possessed but applied to practice, we see clear in. stances of judgment. Architects, lawyers. and doctors are professionals whose work constantly involves the making of judgments. It is true of any of us when we are in moral Situations: we have to make moral judgments. It is true of teachers and farmers and theoretical physicists as well: all must make judgments in the praise of their occupations and in the conduct of their lives. 'There are practical, productive. and theoretical judgments. As Aristotle would have put it. Insofar as we make such judgments well. we can be said to behave wisely.

It should be kept in mind that good professionals make good judgments about their own practice as well as about the subject matter of their practice. A good doctor not only makes good diagnoses of patients and pre- scribes well for them. but also makes good judgments about the field of medicine and his or her ability to practice it. Good judgment takes anything into account. including itself A judgment. then. is a determination—of thinking. of speech. of action. or of creation. A gesture. such as the wave of a hand. can be a judgment: a metaphor. like "John is a worm." is a judgment. an equation. like $E=mc^2$. Is a judgment. They are judgments be, cause. in part. They have been reached in certain ways, relying on certain in struments or procedures in the process They are likely to be good judgment if they are the products of fully performed acts guided by or facilitated by appropriate instruments and procedures If we now at the process of

critical thinking and identify its essential characteristics. we can better understand its relationship to judgment. I will argue that critical thinking is skillful. Thinking facilitates good Judgment because it I) relies upon criteria. (2) is self-correcting. and (3) ds sensitize to context.

Critical Thinking Relies on Criteria

We suspect an association between the terms critical and criteria because they have a common ancestry We are

The third wave of critical thinking research and practice is only just now beginning to emerge. As yet there are few who see clearly the enormity of the task which the field faces. The success of the third wave can be achieved only with a growing recognition of the strengths and weaknesses of the first two waves. First wave research needs to bring its rigor and depth into a broader complex of concerns. Second wave research needs to integrate rigor and depth into its comprehensiveness. Theory of teaching and learning (based on theory of thinking, emotion, and action) need to be carefully integrated.

also aware of a relationship between criteria and judgments. for the very meaning of criterion is "a rule or principle utilized in the making of Judgments." A criterion is an instrument for Judgments as an ax is an instrument for chopping. It seems reasonable to conclude. therefore. that there is some sort of logical connection between "critical thinking' and "criteria" and "judgment ."The connection. of course. is to be found in the fact that judgment is a skill. critical thinking is skillful thinking, and skills cannot be defined with- out criteria by means of which allegedly skillful performances can be evaluated. So critical thinking is thinking that both employs criteria and that can be assessed by appeal to criteria.

The fact that critical thinking relies upon criteria suggests that it is well-founded. structured, and reinforced thinking. as opposed to "uncritical' thinking. which is amorphous. haphazard and unstructured. Critical thinking seems to be defensible and convincing. How does this happen?

Whenever we make a claim or utter an opinion. we are vulnerable unless we can back it up with reasons. What is the connection between reasons and criteria? Criteria are reasons: they are one kind of reason. but it is a particularly reliable kind. When we have to sort things out descriptively or evaluatively—and these are two very in-to use the

port-ant tasks—we" most reliable reasons we can find, and these are classificatory and evaluational criteria. Criteria may or may not have a high level of public acceptance, but they have a high level of acceptance and respect in the community of inquiry. The competent use of such respected criteria IS a way of establishing the objectivity of our prescriptive. descriptive, and evaluative judgments Thus. architects will judge a building by employing such criteria as utility, safety, and presumably, critical thinkers rely upon such lime tested criteria as validity. evidential warrant. and consistency. Any area Of practice—architectural. cognitive. And the like—should be able to Cite the criteria by which that practice is guided.

The intellectual domiciles we inhabit are often of flimsy construction; we can strengthen them by learning to reason more logically. But this Will help little if their foundations are soft and spongy. We need to rest our claims and of our thinking—upon footings as firm as bedrock. One way of putting our thinking upon a solid foundation is to rely upon sound criteria.

Here. then. is a brief list of the sorts of things we invoke or appeal to and that therefore represent specific kinds of criteria:

- standards,
- laws. bylaws. rules, regulations;
- precepts. requirements. specifications;
- conventions. norms. regularities;
- principles, assumptions, presuppositions. definitions;
- ideals. goals. objectives:
- tests. credentials, experimental findings; methods, procedures, policies.

All of these instruments are part of the apparatus of rationality Isolated in categories in a taxonomy. as they are here, they appear inert and sterile But when they are at work in the process of inquiry. they function dynamically—and critically.

As noted, by means of logic we can validly extend our thinking. by means of reasons such as criteria we can justify and defend it. The improvement of student thinking—from ordinary thinking to good thinking—depends heavily upon students' ability to identify and Cite good reasons for their opinions (see fig. I). Students can be brought to realize that. for a reason to be called good, it must be relevant to the opinion in question and stronger (in the sense of being more readily

accepted, or assumed to be the case) than the opinion in question.

Critical thinking is a sort of cognitive accountability' When we openly state the criteria we employ—for example, in assigning grades to students—we encourage students to do likewise. By demonstrating models of intellectual responsibility. we invite students to assume responsibility for their own thinking and. in a larger sense. for their own education.

When we have to select among criteria. we must of course rely on other criteria to do so. Some criteria serve this purpose better than others and can therefore be said to operate as meta-criteria. For example, when I pointed out earlier that criteria are especially reliable reasons and that good reasons are those that reveal strength and relevance. I was saying that reliability, strength, and relevance are important meta-criteria. Coherence and consistency are others.

Some criteria have a high level of generality and are often presupposed, explicitly or implicitly. whenever critical thinking takes place. Thus the notion of knowledge presupposes the criterion of truth. and so wherever scientific knowledge is claimed, the concomitant claim being made is that it is true. In this sense. Philosophical domains such as epistemology. Ethics, and aesthetics do not dictate the criteria relevant to them; rather. the criteria define the domains. Epistemology consists of judgments to which truth and falsity are the relevant ethics comprises judgments to which right and wrong are relevant; and aesthetics contains judgments to which beautiful and not-beautiful are relevant. Truth. right. wrong. just. good. beautiful—all of these are of such vast scope that we should probably com Sider them mega-criteria And they in turn are instances of the great galactic criterion of meaning.

One of the primary functions of criteria is to provide a basis for comparisons. When a comparison is made and no basis or criterion is given (for example. "Tokvo is better than New York"). confusion results. On the other hand. if several competing criteria might be applicable (as when someone "Tokvo is larger than New York" but does not specify whether in size or in population the situation can be equally confusing. Just as opinions should generally be backed up with reasons. Comparisons should generally be accompanied by criteria.

Sometimes criteria are introduced ' 'informally" and extemporaneously. as when someone remarks that Tuesday's weather was good compared with while Wednesday's weather was bad

compared with Monday's In this case. Monday's weather is being used as an Informal criterion. Even figurative language can be understood as involving the use of informal criteria, Thus. an open simile such as • The school was like an army camp• suggests the regimentation of an army camp as an informal criterion against which to measure the orderliness of the school.

On the other hand, when criteria are considered by an authority or by general consent to be a basis of comparison. we might speak of them as "formal" criteria. When we compare the quantities of liquid in two tanks in terms Of gallons. we are employing the unit of the gallon on the say, so of the Bureau of Weights and Measures. The gallon measure at the Bureau is the institutionalized paradigm case to which our gallon measure is Comparable.

So things are compared by means of more or less formal criteria, But there is also the distinction between comparing things with one another and comparing them with an ideal standard. a distinction Plato addresses in Statesman f' For example. in grading test papers. we may compare a student's performance with the performances of other students in the class (using "the curve" as a criterion): or we may compare it with the standard of an error-free performance.

Standards and criteria are terms often used interchangeably in ordinary discourse Standards. however. represent a vast subclass of criteria, It is vast because the concept of standard can be understood in many different ways, There IS the Interpretation Cited in the preceding paragraph. where we are talking about a standard Of perfection. There are. in contrast. standards as minimal levels of performance. as in the Oh-heard cry, must not lower our standards" There is a sense in which standards are conventions of conduct "When in Rome, do as the Romans do; "There is also the sense in which standards are the units of measurement defined authoritatively by a bureau of standards. There is. of course. a certain arbitrariness about even the most reliable standards. such as units Of measurement. in that we are free to define them as we like. We could. if we liked. define a yard as containing fewer inches than it presently does. But the fact is that. once defined. we prefer such units to be unchanging they are so much more reliable that way. Perhaps we can sum up the relationship between criteria and standards by saying that criteria specify general requirements. while standards represent the degree to which these requirements need be

satisfied in particular instances. Criteria—and particularly standards among them—are among the most valuable instruments of rational procedure.

Critical Thinking is Self-Correcting

the most characteristic feature of inquiry is that it aims to discover its weaknesses and rectify what is at fault in its own procedures. Inquiry, then, is self-correcting.

Much of our thinking unfolds impressionistically, from assentation to association, with little concern for either truth or validity, and with even less concern for the possibility that it might be erroneous. Among the many things we may reflect upon is our own thinking, yet we can do so in a way that is still quite uncritical. And so, "meta-cognition," or thinking about thinking.

One of the most important advantages of converting the classroom into a community of inquiry (in addition to the improvement of moral climate) is that the members of the community not only become conscious of their own thinking but began looking for and correcting each other's methods and procedures. Consequently, insofar as each participant can internalize the methodology of the community as a whole, each participant is able to become self-correcting in his or her own thinking.

Critical Thinking Is Sensitive to Context

Just as critical thinking is sensitive to uniformities and regularities that are generic and intercontextual, it is sensitive to situational characteristics that are holistic or context-specific. Thinking that is sensitive to context takes into account:

a) exceptional or irregular circumstances and conditions—for example, a line of investigation ordinarily considered *ad hominem* and therefore fallacious might be found permissible in a trial;

(b) special limitations, contingencies, or constraints—for example, the rejection of certain Euclidean theorems, such as that parallel lines never meet, in non-Euclidean geometries

(c) overall configurations—for instance, a remark taken out of context may seem to be flagrantly in error but in the light of the discourse taken as a whole appears valid and proper, or vice versa;

(d) the possibility that evidence is atypical—for example, a case of

overgeneralizing about national voter preferences based on a tiny regional sample of ethnically and occupationally homogeneous individuals

(e) the possibility that some meanings do not translate from one context or domain to another—there are terms and expressions for which there are no precise equivalents in other languages and whose meanings are therefore wholly context-specific.

In performing this exercise, students apply the criterion of *turn taking* (i.e., *fair play or justice*) to six situations requiring sensitivity to context. Classroom discussion should distinguish between those situations in which the procedure of turn-taking is appropriate and those in which it is dubious. Using exercises like these in a community of inquiry sets the stage for critical thinking in the classroom. It is not the only way to accomplish this, but it is one way.

Bibliography

- Anderson, Lorin W., David R. Krathwohl, Peter W. Airasian, Kathleen A. Cruikshank, Richard E. Mayer, Paul R. Pintrich, James Raths, and Merlin C. Wittrock, 2001, *A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*, New York: Longman, complete edition.
- Berman, Alan M., Seth J. Schwartz, William M. Kurtines, and Steven L. Berman, 2001, "The Process of Exploration in Identity Formation: The Role of Style and Competence", *Journal of Adolescence*, 24(4): 513–528. doi:10.1006/jado.2001.0386
- Casserly, Megan, 2012, "The 10 Skills That Will Get You Hired in 2013", *Forbes*, Dec. 10, 2012. Available at <https://www.forbes.com/sites/meghancasserly/2012/12/10/the-10-skills-that-will-get-you-a-job-in-2013/#79e7ff4e633d>; accessed 2017 11 06.
- Center for Assessment & Improvement of Learning, 2017, *Critical Thinking Assessment Test*, Cookeville, TN: Tennessee Technological University.
- Cohen, Jacob, 1988, *Statistical Power Analysis for the Behavioral Sciences*, Hillsdale, NJ: Lawrence Erlbaum Associates, 2nd edition.
- College Board, 1983, *Academic Preparation for College. What Students Need to Know and Be Able to Do*, New York: College Entrance Examination Board, ERIC document ED232517.
- Commission on the Relation of School and College of the Progressive Education Association, 1943, *Thirty Schools Tell Their Story*, Volume V of *Adventure in American Education*, New York and London: Harper & Brothers.
- Dalglish, Adam, Patrick Girard, and Maree Davies, 2017, "Critical Thinking, Bias and Feminist Philosophy: Building a Better Framework through Collaboration", *Informal Logic*, 37(4): 351–369. [Dalglish et al. available online]
- Dewey, John, 1910, *How We Think*, Boston: D.C. Heath. [Dewey 1910 available online]
- —, 1916, *Democracy and Education: An Introduction to the Philosophy of Education*, New York: Macmillan.
- —, 1933, *How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process*, Lexington, MA: D.C. Heath.

- —, 1936, “The Theory of the Chicago Experiment”, Appendix II of Mayhew & Edwards 1936: 463–477.
- —, 1938, *Logic: The Theory of Inquiry*, New York: Henry Holt and Company.
- Dominguez, Caroline (coord.), 2018a, *A European Collection of the Critical Thinking Skills and Dispositions Needed in Different Professional Fields for the 21st Century*, Vila Real, Portugal: UTAD. Available at <http://bit.ly/CRITHINKEDUO1>; accessed 2018 04 09.
- — (coord.), 2018b, *A European Review on Critical Thinking Educational Practices in Higher Education Institutions*, Vila Real: UTAD. Available at <http://bit.ly/CRITHINKEDUO2>; accessed 2018 04 14.
- Dumke, Glenn S., 1980, *Chancellor’s Executive Order 338*, Long Beach, CA: California State University, Chancellor’s Office. Available at <https://www.calstate.edu/eo/EO-338.pdf>; accessed 2017 11 16.
- Ennis, Robert H., 1958, “An Appraisal of the Watson-Glaser Critical Thinking Appraisal”, *The Journal of Educational Research*, 52(4): 155–158. doi:10.1080/00220671.1958.10882558
- —, 2011, “Critical Thinking: Reflection and Perspective Part I”, *Inquiry: Critical Thinking across the Disciplines*, 26(1): 4–18. doi:10.5840/inquiryctnews20112613
- —, 2013, “Critical Thinking across the Curriculum: The Wisdom CTAC Program”, *Inquiry: Critical Thinking across the Disciplines*, 28(2): 25–45. doi:10.5840/inquiryct20132828
- —, 2016, “Definition: A Three-Dimensional Analysis with Bearing on Key Concepts”, in Patrick Bondy and Laura Benacquista (eds.), *Argumentation, Objectivity, and Bias: Proceedings of the 11th International Conference of the Ontario Society for the Study of Argumentation (OSSA), 18–21 May 2016*, Windsor, ON: OSSA, pp. 1–19. Available at <http://scholar.uwindsor.ca/ossaarchive/OSSA11/papersandcommentaries/105>; accessed 2017 12 02.
- —, 2018, “Critical Thinking Across the Curriculum: A Vision”, *Topoi*, 37(1): 165–184. doi:10.1007/s11245-016-9401-4
- Ennis, Robert H., and Jason Millman, 1971, *Manual for Cornell Critical Thinking Test, Level X, and Cornell Critical Thinking Test*,

Level Z, Urbana, IL: Critical Thinking Project, University of Illinois.

- Ennis, Robert H., Jason Millman, and Thomas Norbert Tomko, 1985, *Cornell Critical Thinking Tests Level X & Level Z: Manual*, Pacific Grove, CA: Midwest Publication, 3rd edition.
- —, 2005, *Cornell Critical Thinking Tests Level X & Level Z: Manual*, Seaside, CA: Critical Thinking Company, 5th edition.
- Ennis, Robert H. and Eric Weir, 1985, *The Ennis-Weir Critical Thinking Essay Test: Test, Manual, Criteria, Scoring Sheet: An Instrument for Teaching and Testing*, Pacific Grove, CA: Midwest Publications.
- Facione, Peter A., 1990a, *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction*, Research Findings and Recommendations Prepared for the Committee on Pre-College Philosophy of the American Philosophical Association, ERIC Document ED315423.
- —, 1990b, *California Critical Thinking Skills Test, CCTST – Form A*, Millbrae, CA: The California Academic Press.
- —, 1990c, *The California Critical Thinking Skills Test--College Level. Technical Report #3. Gender, Ethnicity, Major, CT Self-Esteem, and the CCTST*, ERIC Document ED326584.
- —, 1992, *California Critical Thinking Skills Test: CCTST – Form B*, Millbrae, CA: The California Academic Press.
- —, 2000, “The Disposition Toward Critical Thinking: Its Character, Measurement, and Relationship to Critical Thinking Skill”, *Informal Logic*, 20(1): 61–84. [[Facione 2000 available online](#)]
- Glaser, Edward Maynard, 1941, *An Experiment in the Development of Critical Thinking*, New York: Bureau of Publications, Teachers College, Columbia University.
- Halpern, Diane F., 1998, “Teaching Critical Thinking for Transfer Across Domains: Disposition, Skills, Structure Training, and Metacognitive Monitoring”, *American Psychologist*, 53(4): 449–455. doi:10.1037/0003-066X.53.4.449
- Paul, Richard W., 1981, “Teaching Critical Thinking in the ‘Strong’ Sense: A Focus on Self-Deception, World Views, and a Dialectical Mode of Analysis”, *Informal Logic*, 4(2): 2–7. [[Paul 1981 available online](#)]

- —, 1984, “Critical Thinking: Fundamental to Education for a Free Society”, *Educational Leadership*, 42(1): 4–14.
- —, 1985, “McPeck’s Mistakes”, *Informal Logic*, 7(1): 35–43. [Paul 1985 available online]
- Paul, Richard W. and Linda Elder, 2006, *The Miniature Guide to Critical Thinking: Concepts and Tools*, Dillon Beach, CA: Foundation for Critical Thinking, 4th edition.
- Stanovich Keith E., and Paula J. Stanovich, 2010, “A Framework for Critical Thinking, Rational Thinking, and Intelligence”, in David D. Preiss and Robert J. Sternberg (eds), *Innovations in Educational Psychology: Perspectives on Learning, Teaching and Human Development*, New York: Springer Publishing, pp 195–237.
- Stanovich Keith E., Richard F. West, and Maggie E. Toplak, 2011, “Intelligence and Rationality”, in Robert J. Sternberg and Scott Barry Kaufman (eds.), *Cambridge Handbook of Intelligence*, Cambridge: Cambridge University Press, 3rd edition, pp. 784–826. doi:10.1017/CBO9780511977244.040
- Tankersley, Karen, 2005, *Literacy Strategies for Grades 4–12: Reinforcing the Threads of Reading*, Alexandria, VA: Association for Supervision and Curriculum Development.
- Thayer-Bacon, Barbara J., 1992, “Is Modern Critical Thinking Theory Sexist?”, *Inquiry: Critical Thinking Across the Disciplines*, 10(1): 3–7. doi:10.5840/inquiryctnews199210123
- —, 1993, “Caring and Its Relationship to Critical Thinking”, *Educational Theory*, 43(3): 323–340. doi:10.1111/j.1741-5446.1993.00323.x
- —, 1995a, “Constructive Thinking: Personal Voice”, *Journal of Thought*, 30(1): 55–70.
- —, 1995b, “Doubting and Believing: Both are Important for Critical Thinking”, *Inquiry: Critical Thinking across the Disciplines*, 15(2): 59–66. doi:10.5840/inquiryctnews199515226
- —, 2000, *Transforming Critical Thinking: Thinking Constructively*, New York: Teachers College Press.
- Toulmin, Stephen Edelston, 1958, *The Uses of Argument*, Cambridge: Cambridge University Press.
- Turri, John, Mark Alfano, and John Greco, 2017, “Virtue Epistemology”, in Edward N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Winter 2017 Edition). URL =

<<https://plato.stanford.edu/archives/win2017/entries/epistemology-virtue/>>

- Warren, Karen J. 1988. “Critical Thinking and Feminism”, *Informal Logic*, 10(1): 31–44. [Warren 1988 available online]
- Watson, Goodwin, and Edward M. Glaser, 1980a, *Watson-Glaser Critical Thinking Appraisal, Form A*, San Antonio, TX: Psychological Corporation.
- —, 1980b, *Watson-Glaser Critical Thinking Appraisal: Forms A and B; Manual*, San Antonio, TX: Psychological Corporation,
- —, 1994, *Watson-Glaser Critical Thinking Appraisal, Form B*, San Antonio, TX: Psychological Corporation.
- Weinstein, Mark, 1990, “Towards a Research Agenda for Informal Logic and Critical Thinking”, *Informal Logic*, 12(3): 121–143. [Weinstein 1990 available online]
- —, 2013, *Logic, Truth and Inquiry*, London: College Publications.
- Zagzebski, Linda Trinkaus, 1996, *Virtues of the Mind: An Inquiry into the Nature of Virtue and the Ethical Foundations of Knowledge*, Cambridge: Cambridge University Press.
- doi:10.1017/CBO9781139174763