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Strategies for Studying, Learning, and Researching
By David Alderoty © 2014

Chapter 8) Critical Thinking and Related Concepts
2,129 words

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After I complete a writing task, I select a number of websites from other authors, to provide additional information, alternative points of view, and to support the material I wrote. These websites contain articles, videos, and other useful material. The websites can be accessed by clicking on the hyperlinks, which are the **blue underlined words**, presented at the end of some of the sections, subsections, and paragraphs. If a link fails, use the blue underlined words as a search phrase, with www.Google.com or www.Bing.com

Introduction: Critical Thinking

Note for this Chapter

The following material is partly based on the ideas that were

presented in the previous chapters. **Ideally**, you should read, or

review, **chapters 6** and **7**, before reading this chapter. In this chapter, critical thinking is defined, and several critical thinking skills are described and illustrated with **hypothetical** critical thinkers.

What is Critical Thinking?

Critical thinking is essentially a set of skills, based on evidence and logic, for evaluating the validity of ideas, and for creating sound arguments. There are **many definitions of critical thinking**, some of which are displayed on the following five websites: **1)** THE CRITICAL THINKING COMMUNITY,   **2)** What is critical thinking?,   **3)** Critical Thinking Co.,   **4)** What is this critical thinking and how do you do it?,   **5)** What is Critical Thinking? A Definition

After examining many sources on critical thinking, including the above, I devised the definition and description presented in the following paragraphs.

A Definition and Description of Critical Thinking

A Definition of Critical Thinking

Critical thinking is a methodology that is comprised of a set of thinking skills, based on logic and evidence, used to assess the **validity** and **utility** of **information**, **especially for the following**:

1) For assessing the validity of arguments, evidence, and conclusions

2) For creating sound arguments, and deriving valid conclusions

3) For good decision-making, planning, problem solving, and goal attainment efforts

In general, critical thinking can involve observations, experimentation, scientific facts, analytical techniques, mathematics, as well as formal and informal logic. This includes deductive and inductive reasoning. **However**, critical thinking usually involves informal logic, **based on evidence**. This is the evaluation method used by a good jury, when they are trying to arrive at a verdict. They weighed the evidence. This includes attempts to determine the probable validity and relevance of each piece of evidence, with the goal of deriving a conclusion. This is explained in more detail in the following paragraphs.

The Difference Between Critical Thinking & Formal Logic
Critical thinking is logical thinking, and it may sometimes involve **formal logic**. However, critical thinking is **not limited** to **formal logic**, which has minimal utility when dealing with complex systems, such as human beings, organizations, societies, cultures, and nations. Thus, critical thinkers often use **evidence**, and **informal logic** to create arguments, derive conclusions, and solve problems. This is generally a more useful, and flexible thinking strategy, when applied to real world problems.

However, the evidence, and related conclusions obtained with **informal logic** are generally **not as** certain as the conclusions obtainable with **formal logic**. Skillful critical thinkers are aware of this, and they will test their conclusions with experimentation, or with assessments based on real world results.

Deriving Practical Conclusions With Critical Thinking

The conclusions derived with formal logic, are usually limited, such as to determine if the proposition of the argument is true or false. With **real-world** arguments, problems, and goals are usually complex. As a result, deriving **real-world solutions and conclusions** usually requires informal logic coupled with experimentation and/or real-world evaluations.

The following are some examples of real-world CONCLUSIONS, which can be derived with informal logic and evidence.

1) The estimated cost of a personal goal or business related project

2) Assessments of the overall feasibility of a goal or project

3) The relative degree of risks involved with a goal or project

4) Moral and legal considerations, associated with a goal or project

5) A list of possible causes for a problem, and/or a list of possible solutions

6) An engineering design to create a new product

7) A marketing plan to sell a new product

8) A set of personal or business related plans

9) A set of instructions on how to achieve an objective

10) A set of cause and effect sequences, explained with written language, which led to a problem, or accident

Critical Thinking Strategies, Illustrated with Hypothetical Critical Thinkers

What Critical Thinkers Want to Know

Critical thinkers want to know how ideas and conclusions were derived. They want to know what is the supporting evidence and logic that led to a belief, an idea, hypothesis, theory, or conclusion. Most importantly, they are interested in the quality and relevance of the supporting evidence. They want to know if there are alternative interpretations and conclusions based on the evidence.

Critical Thinkers Might Question or Challenge Socially Established Ideas

Critical thinkers might evaluate ideas and beliefs that are taken for granted by most people, within a society. They will analyze, evaluate, and sometimes challenge, political, and religious, ideas, as well as information provided by authority figures. These evaluations may reveal fallacies, as well as irrational or

counterproductive thinking, planning, and actions.

Critical Thinking Does Not Involve the Persuasive Techniques Used by Advertisers, Politicians, and Lawyers

Critical thinkers are **not** influenced by the conventional persuasive techniques used by advertises and politicians. When techniques of this nature are used, it may raise doubts or suspicions in critical thinkers. When critical thinkers evaluate an argument, they will examine the **evidence supporting** the argument. However, they will also look for **evidence that refutes** the argument.

When critical thinkers **create valid arguments**, they do not use the persuasive methods used by advertising agencies and politicians. They do not select evidence for their arguments, in the way that a lawyer does. That is, they do **not** select out statistics or other evidence that support their arguments, and ignore evidence that refutes their arguments.

Modification of Arguments, Hypotheses, and Conclusions to Fit the Available Evidence

Critical thinkers do not become emotionally involved with the conclusions they derive. They are not overly concerned about convincing other people that they are correct. This is because critical thinking is based on available evidence and logic. Thus, a skillful critical thinker may present conclusions to others, with the words: based on the available evidence, I conclude.

Critical thinkers modify their arguments, hypotheses, and conclusions to **fit the available evidence**. This can involve a series of modifications as new evidence is obtained over a period of days, weeks, months, or years.

Critical Evaluations of: Thinking, Behaviors, Results, and Conclusions

Critical Evaluation of Thinking, and Behaviors

Critical thinkers are critical of their own thinking, and they attempt to evaluate their own thought processes. They will reevaluate their arguments, supporting evidence, and conclusions a number of times to check for validity, and to make corrections.

Critical thinkers may try to free themselves from their own psychology and cultural upbringing, when evaluating information, creating arguments, and deriving conclusions. This is useful in identifying and removing distortions in thinking, which may come from emotional desires, irrelevant beliefs, culture, customs, and the socialization process.

Critical thinkers may also evaluate the results of their own thinking in terms of their goal attainment efforts, emotional responses, and behaviors. This involves self-evaluation of their thinking and related **actions in terms of results.** This includes evaluations of their successful or failed outcomes, as well as assessments of adverse consequences, or conflict that may have resulted from their actions. These self-evaluations serve as a

form of corrective feedback that may improve overall success.

<u>Thinking Style and Behavior of Others</u>

Critical thinkers may also attempt to evaluate the thought processes, and behaviors of others, with the strategies described above. This involves evaluating the arguments, conclusions, goals, actions, and verbal explanations of others. This can include observations and discussions with the relevant individuals, to obtain a better understanding of their reasoning.

Attempts to understand the thought processes of others, does **not** necessarily include efforts to change their thinking, beliefs, and behaviors. Skillful critical thinkers are interested in the thinking style of others, primarily to communicate and negotiate more effectively, and to develop harmonious relationships.

<u>Critical Thinking, and the Utility of Understanding the Point of View and Thinking Style of Others</u>

An understanding of the way people that you are working with, socializing with, or living with think, evaluate, and interpret the actions of others, can be helpful in avoiding conflict, and maintaining friendly and successful relationships. In general, **differences** in age, needs, experiences, education, culture, financial resources, social status, roles, and gender may result in different ways of interpreting and evaluating. For example,

younger people often experience conflict with their parents, which might be based on differences in needs, experience, and age. Conflict with an employee and a boss, may involve a difference in needs, roles, social status, and experience.

Especially important is an understanding of the needs, values, goals, desires, and expectations of the people you are dealing with in school, on-the-job, in your social circle and family. This can prevent conflict, and result in harmonious and successful relationships.

Strategies and Related Actions, Evaluated with Critical Thinking

One of the main concepts of critical thinking is to evaluate how conclusions or results were obtained. This concept can be applied to almost any type of personal, or business related objective. This includes evaluations of decision-making, problem solving, and goal attainment strategies in relation to personal goals, or business related projects. **Evaluations of this nature should not be limited to thinking and planning strategies. That is the specific actions or techniques, involved with obtaining a specific objective should be evaluated.** This is because both **thinking** and **action strategies**, can determine the **success or failure** of a personal goal, or business project.

An understanding of the above is useful when goal attainment efforts fail. It is important to understand if the failure

resulted from <u>poor thinking strategies</u>, <u>inadequate planning</u>, <u>lack of relevant information</u> and/or <u>deficiencies in carrying out the steps that were required to obtain the objective</u>.

<u>Evaluations Based on: Logic, Experimentation, And Real-World Assessments</u>

There are three basic methods of assessing the utility and validity of hypotheses, conclusions, techniques, inventions, products, and services, described below.

1) Various systems of logic, such as deductive and inductive reasoning, can be used for evaluating arguments, and conclusions. This works well with mathematics, and various types of logic problems, but it may not be very useful for complex real-world evaluations.

2) The experimental method is considered by most sources to be the most accurate and ideal evaluation strategy. This usually involves controlled laboratory conditions, to determine validity or utility of a concept, a hypothesis, and invention, a drug, or anything else.

3) The third technique, I am calling <u>real world assessments,</u> which is probably self-explanatory. This simply involves evaluations that are not carried out in the laboratory, and are based on results obtained by practical applications. This may also include consumer response to a product or service, especially in terms of sales and long-term consumer satisfaction.

The important idea to understand is an idea, theory, drug, or invention, might work well when evaluated in the laboratory, under experimentally controlled conditions, but it may fail when assessed with real-world evaluations. This is because, the real world has **many unpredictable variables**, that can determine whether an idea, theory, drug, or invention is practical or produces desirable results. **In addition, in the real world, desirable results are determined by the personal values of individuals that use a product or service.** The inventor or manufacture of a product may have very different values, then the typical consumer.

Concluding Concepts for Critical Thinking

Critical thinking implies evaluation of thinking and related actions, especially in terms of real-world results. These evaluations can be applied to individuals, organizations, and nations, as well as the self. These evaluations can provide useful insights to help us deal with the individuals and organizations we are faced with throughout life. When the evaluations are applied to your own thoughts and actions, they can function as a feedback and correction mechanism, to improve your thinking and chances of success.

See the Following Websites From Other Authors for Additional Information, and Alternative Perspectives on

<mark>Critical Thinking and Related Concepts</mark>

Twelve Articles and Websites on Critical Thinking

1) Critical Thinking: Where to Begin, **2)** Teaching & Learning Critical Thinking, **3)** Critical Thinking On The Web, **4)** Critical Thinking at the Free University, **5)** How to Train Your Mind to Think Critically, **6)** "What Is Critical Thinking?, **7)** Scientific Thinking is a free PDF e-book, **8)** Your Deceptive Mind: A Scientific Guide to Critical Thinking Skills is a free PDF e-book, **9)** Professional Development Module on Critical Thinking Skills, **10)** A PRACTICAL GUIDE TO CRITICAL THINKING, **11)** Critical Thinking, Moral Integrity and Citizenship, **12)** Blocks to Critical Thinking

Ten Websites with Videos on Critical Thinking

1) Teaching Critical Thinking-Full Video, **2)** Critical Thinking Crash Course" by Dr. Peter Boghossian, **3)** CriticalThinkingOrg, **4)** A Thought Experiment, **5)** How to Think Critically and Learn Anything, **6)** Seven webpages, with videos on critical thinking, by Dr. Sadler, **7)** Standards of Thought-Part 1, **8)** Standards of Thought-Part 2, **9**) Problem Solving & Critical Thinking: How to Build Vital Capabilities, **10)** The following is set of over 50 webpages, from a video search engine, which contains over 3,000 videos on critical thinking. www.Mashpedia.com/Critical_Thinking Note, to go from one webpage to another, scroll down to the bottom of the page, and click on

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