



**DeVry Institute of Technology**  
**Long Island City, New York**  
**Logic, Critical Thinking and Problem Solving**  
**COLL 147 Section N**  
**March 2005**

This course designed to help you master the fundamentals of effective problem solving both in theory and practice. The major areas of subject matter and activity in the course are problem solving methodologies, research strategies, logical reasoning, critical analysis of information, and collaborative learning.

Professor R. Anthony Milon  
Keller Graduate School of Management  
E-mail: [rmilon@keller.edu](mailto:rmilon@keller.edu) or [rmilon@ny.devry.edu](mailto:rmilon@ny.devry.edu)  
Class meetings: Monday evenings  
Class Room 122 (6 PM – 8:50 PM)  
Office Hours: By appointment  
Phone: 718-473-9933

**Required Course Materials:**

**Readings provided via eColl**

Folio Live (Electronic portfolio tool)

**Credit hours:** 3

**Class Description:** The class will consist of a series of reading assignments from the textbook and articles placed in the doc sharing link of the course website. Students will work alone and in groups with most class time focused on lecture and small- and large-group discussion. Outside projects and research will be assigned as individual assignments and as groups.

**Syllabus Contents:**

Course Objectives	3	Appendix 1	12
Class Expectations	4	Appendix II	17
Instructor Expectations	5	Appendix III	19
Course Outline	7		
Critical thinking sources	11		

## I. **Course Strategy:**

Thinking critically and applying logical frameworks involves consciously observing, analyzing, synthesizing, evaluating, and problem solving according to well-tested standards. In this course, the basic knowledge needed for critical thinking is introduced. The results of this process are further evaluated according to standards for clarity, accuracy, relevance, reliability, and fairness. Thinking skills are then exercised through observation, analysis, and problem solving.

This course also examines and amplifies the logical and critical thinking skills learned formally and informally throughout the curriculum, allowing the student to think critically about the decisions and accomplishments of the past, prepare for entrance into the workplace, and formulate and revise personal and professional decisions. The basics of critical thinking and the problems associated with critical thinking are explored. These skills and abilities become an asset to the student and the project groups to which each student is assigned in upper-level and capstone courses.

## II. **Rationale:**

The call from business, industry, and government is for employees who can evaluate current situations and creatively respond with new ideas and options. DeVry's program advisory boards continually recommends the need for communication, logic, and problem solving skills for its graduates. These abilities are requisite for entry into a profession and become increasingly important for advancement within the organization. As a result, the development of these skills is an integral part a student's academic career leading to success in the chosen profession.

Given the technological and informational revolution, there are ever increasing amounts of information available in most areas of industry and business. Through this course, the student develops strategies to evaluate the sources and appropriateness of the information, develops creative alternative solutions, and chooses, implements, and evaluates alternatives. The inclusion of a collaborative report and presentation prepares students for work in teams.

Given the needs of business and industry, and of society as a whole, the skills associated with logic and critical thinking are essential. Logic and critical thinking are subjects that go well together and are generally and easily grouped together in an introductory class. The skills of logical and critical thinking are conducive to a student's ability to learn, change, and adapt to new and challenging situations.

## III. **Course Objectives:**

1. Define the problem: Given a problem situation or a case study in a business or technical environment, analyze its components to define the problem and identify possible causes.
2. Generate solutions: Given a situation or a case study with a clearly defined problem, research and evaluate appropriate strategies to generate possible solutions.
3. Decide on a course of action: Given a clearly defined problem situation or case study with potential solutions, use valid research, team consensus and analysis strategies to select the most appropriate action to be taken.
4. Implement the solution: Given a specific solution to a particular problem, develop an effective implementation plan, including project management techniques such as Gantt charts, to plan implementation of that solution.
5. Given an inference stated in natural language, analyze the argument to determine whether it contains any of the common logical fallacies.
6. Given a problem situation or case study requiring a multiple step solution explain the use of visual representation to illustrate the logic of the solution.
7. Given a problem situation or case study involving an issue such as affirmative action or sexual harassment , apply the principles of argument and ethical decision making to identify the issues and formulate an opinion.
8. Given a problem situation or case study involving cultural differences use the principles of value assumptions to analyze how conflicting values can bring about differing conclusions.
9. Given a problem situation to be solved by a team, research, develop and apply team guidelines addressing issues such as conflict resolution and effective communication.
10. Given a need for information in order to solve a problem, determine and apply the appropriate research strategies for retrieval of information. Evaluate those resources using clearly defined research criteria.
11. Given a problem situation or case study, participate as a member of a student team that applies the principles of problem solving, logical analysis, teamwork and research to formulate a solution. Present the solution in a written and/or oral professional format.

#### IV. Class Expectations and Grading:

The following will be required of you while taking this class:

A.	Midterm	200 points
B.	Team Project and presentation	150 points
C.	Electronic Portfolio	100 points
D.	Course Participation and attendance	50 points
E.	Final Examination	300 points
F.	Journal	50 Points Extra

---

800 points

## Grade Scale

<u>Letter Grade</u>	<u>Numerical Equivalent</u>
A	90-100
B	80-89
C	70-79
D	60-69
F	Below 60
I	Incomplete

A) The midterm will be an essay exam consisting of 5 (Five) identification and three short essay questions. Choices will be offered to the student on each exam. Prior to the test I recommend that you keep good notes on the readings and class lectures. The Essay Final Examination is comprehensive in that it will cover all work presented in this course. I DO NOT GIVE MAKE UP EXAMS. (Read the note below, under philosophy of the instructor).

B) Team Presentation: Teams will be created and complete research on a current topic and present all sides of the issue in class. The issues-topics and requirements will be presented on the first day of class.

C) Electronic portfolio: All students using the Folio live user's guide must complete an electronic portfolio. This portfolio will be updated as you continue in your studies here at DeVry. You will submit bi-weekly assignments and progress reports related to this project.

D) General Education Policy on Attendance and Lateness: Attendance will be taken within the first 10 minutes of the class. Students who are not present when attendance is taken will be marked as absent. Students who arrive after attendance is taken are strongly encouraged to stay in the class; however they will not be marked present. There will be no partial credit given for lateness.

E) Final Examination: Will be a comprehensive written exam. Sample questions will be offered. The exam will cover all materials covered in class, in the readings, and regarding the simulation and group projects. The final will be evaluated on style and content.

F. Journal activity via eCollege can earn you an additional 20 points toward your point total. Participation is highly encouraged.

## V. Instructor Expectations:

As a student, you are expected to read, understand and follow the procedures and rules of conduct as stated in the DeVry University Student Handbook (<http://www.ny.devry.edu/student-services/stuhandbook.asp>).

See me to discuss what action we can take if you are having problems. I am here to help you, so please see me before little problems become **BIG** ones.

[Specific Regulations]

- 1) Again, you are expected to have the assigned readings completed on the date the topic will be discussed. A quiz may be given on that day or you may be called upon in class.
- 2) I am **VERY STRICT** about make up exams. You must have a legitimate excuse (such as Medical care, death).
- 3) I am **VERY STRICT** about granting incompletes. Only in an extreme case will I even consider that option.
- 4) **General Education Attendance Policy:** Attendance will be taken within the first 10 minutes of the class. Students who are not present when attendance is taken will be marked as absent. Students who arrive after attendance is taken are strongly encouraged to stay in the class, however they will not be marked present. There will be no partial credit given for lateness.
- 5) **APA Format and Documentation:** At DeVry, all student papers should use the APA system for essay format and documentation. Information on this format is provided on the following website: ([http://webster.commnet.edu/apa/apa\\_index.htm](http://webster.commnet.edu/apa/apa_index.htm)) or APA Crib sheet (<http://www.wooster.edu/psychology/apa-crib.html>).
- 6) **A Note on Plagiarism:** Plagiarism is defined by the American College Dictionary as "...copying or imitating the language, ideas, and thoughts of another author and passing off the same as one's original work." **Plagiarism is clear grounds for failure and possible dismissal from DeVry. If you are in doubt about the definition and seriousness of plagiarism, check pages 18- 20 of the DeVry Student Handbook or with the college handbook or see the instructor.** The responsibility in this matter is solely that of the student. Disclaiming intent not to plagiarize is not a valid defense.
- 7) **The Honor System:** Any one receiving or giving answers or talking during any examination or test given during class will receive a ZERO for that assignment and will receive a (F) for a final course grade.
- 8) **Participation:** Students must be prepared to discuss assigned material when they enter class each week. Group participation is mandatory. Scores will be assigned as a portion of group projects based on active participation in the group. Participation and attendance will be evaluated individually and within groups. Participation on eCollege (iOptimize) will count for 10% of your final grade.
- 9) **Respect:** The relationship established by the instructor and the student is very special in encouraging educational development. I offer respect to my students and I expect the same in return. Students should refrain from talking while the lecture is taking place. If you have a question, of course you may ask it. **Turn your beepers and cell phones to silent mode since**

**they disrupt the class.** Rude behavior will not be tolerated at any time during lectures or discussions.



*"Shall we put it in play?"*



## VI. Campus Calendar

Monday	March 7	Semester-length courses begin
Friday	March 25	Good Friday
Sunday	April 24	Session A ends
Monday	April 25	Session B begins and semester-length courses resume
Monday	May 30	Memorial Day
Sunday	June 19	Session B and semester-length courses end

VII. Course Outline:

Key:

- Text readings to be assigned as we go along
- **Articles in bold are on the course website**
- **Folio refers to the Folio Live user's guide**

WK	Topics	Reading Assignment	Team Project Folio Live
1	<p>Course Intro <b>Ice Breaker</b></p> <p><b>What is Critical Thinking and why is it important?</b></p> <p>Assignments and course requirements</p> <p>Formation of groups (teams)</p>	<p>Read the syllabus</p>	<p>Form groups for team project.</p>
2	<p><b>Critical Thinking and Communication</b></p> <p><b>Thinking; Critical Thinking; Perceiving; Issue Analysis</b></p> <p><b>Bloom's Taxonomy Research</b></p>	<p><b>Critical Thinking: What, Why, and How</b>, Richard Paul, <i>from Critical Thinking: What Every Person Needs to Survive in a Rapidly Changing World</i>, Center for Critical Thinking and Moral Critique, 1990 (Critical thinking - Unit 2 # 7)</p> <p><b>Critical Thinking Is in Peril</b>, Mike Masterson, <i>The Arkansas Democrat-Gazette</i>, June 28, 2001 (Critical thinking - Unit 2 # 13)</p> <p>And Appendix II &amp; III of the syllabus</p>	<p>Folio: Chapters 1 &amp; 2 (Complete assignments in chapter 2)</p> <p>Select an issue from today's newspaper. Talk about how this issue has affected you personally. Use the events of your own life as evidence in an argument you construct on this issue.</p>
3	<p><b>Problem Solving</b></p>	<p><b>Team Decision Making Under Normal &amp; Extreme Conditions</b>, George Kuk, Lucy Copeland, and David Wood, <i>ESRC Centre for Research in Development, Instruction, and Training</i>, November 29, 1996 (Communication – Unit 7 # 36)</p>	<p>Group discussions on your topics and various points of view.</p>
4	<p><b>Researching problems</b></p>	<p><b>Using Critical Thinking to Conduct Effective Searches of Online Resources</b>, Sarah K. Brem and Andrea J. Boyes, <i>Practical Assessment, Research &amp; Evaluation</i>, Volume 7, Number 7, 2000 (Research methods- Unit 2 # 6)</p> <p><b>World Wide Web Survey Research: Benefits, Potential Problems, and Solutions</b>, William C. Schmidt, <i>Behavior Research Methods, Instruments &amp; Computers</i>, Volume 29, Number 2, 1997( Research methods-Unit 4 # 18)</p>	<p>Submit progress report (one per group)</p>
5	<p><b>Critical thinking in the workplace</b></p>	<p><b>Attack of the Killer Euphemisms</b>, Vin Suprynowicz, <i>Las Vegas Review-Journal</i>, February 2, 2003 (Critical</p>	<p>Folio: Chapter 3 (Make sure you start working on your electronic portfolio</p>

		thinking – Unit 3 # 20)  <b>The Media Bias Myth</b> , Neal Gabler, <i>Los Angeles Times</i> , December 22, 2002 (Critical thinking – Unit 4 # 25)	
6	<b>Midterm</b>		
7	<b>Constructing Arguments Reasoning Critically Logical Fallacies Making a Presentation</b>	<p><b>Some Thoughts About Induction</b>, Martin Gardner, <i>Skeptical Inquirer</i>, January/February 2002 (Critical thinking - Unit 2 # 10)</p> <p><b>Barriers to Every Day Communication</b>, Nancy J. Foster, <i>Consortium for Appropriate Dispute Resolution in Special Education</i>, 2000 (Communication – Unit 9 # 47)</p> <p><b>With These Words I Can Sell You Anything</b>, William Lutz, <i>from Doublespeak</i>, HarperCollins, 1989 (Critical thinking - Unit 3 # 17)</p> <p><b>Let Gays Marry</b>, Andrew Sullivan, <i>Newsweek</i>, June 3, 1996 (Critical thinking - Unit 6 # 45)</p> <p><b>Cloning Devalues Humanity</b>, Richard Shelby, <i>USA Today</i>, November 28, 2001 (Critical thinking- Unit 6 # 49)</p> <p><b>Knee-Jerk Cloning Bans Threaten Valuable Research</b>, , <i>USA Today</i>, November 28, 2001 (Critical thinking - Unit 6 # 48)</p> <p><b>Active and Passive Euthanasia</b>, James Rachels, <i>The New England Journal of Medicine</i>, (292, Number 2), January 9, 1975 (Ethics -Unit 6 #34)</p>	Submit progress report
8	<b>The logical flow of ideas: arguments and their structure</b>	Catch up on readings	
9	<b>Critical Thinking and moral obligations</b>	<p><b>The Challenge of Cultural Relativism</b>, James Rachels, <i>from The Elements of Moral Philosophy</i>, 3/E, McGraw–Hill, 1999 (Ethics-Unit 1 # 10)</p> <p><b>On the Moral and Legal Status of Abortion</b>, Mary Anne Warren, <i>The Monist</i> 57, January 1973 (Ethics- Unit 2 # 13)</p> <p><b>Yes, the Death Penalty Is Morally Permissible</b>, Louis P. Pojman, <i>from Philosophy: The Quest for Truth</i>, Wadsworth, 1992 (Ethics – Unit 2 # 21)</p> <p><b>Why We Should Ban Human Cloning</b>, George J. Annas, <i>The New England Journal of Medicine</i>, July 9, 1998 (Ethics- Unit 2 # 26)</p>	
10	<b>Applying Critical thinking to management decision making</b>	<b>Some Thoughts About Induction</b> , Martin Gardner, <i>Skeptical Inquirer</i> , January/February 2002 (Critical thinking – Unit 2 # 10)	

		<p><b>Addressing a Group Doesn't Have to Be Torture</b>, Stephen F. Friedman, <i>Business Journal (Central New York)</i>, September 8, 2000 (Communication – Unit 2 # 4)</p> <p><b>Team Decision Making Under Normal &amp; Extreme Conditions</b>, George Kuk, Lucy Copeland, and David Wood, <i>ESRC Centre for Research in Development, Instruction, and Training</i>, November 29, 1996 (Communication – Unit 7 # 36)</p>	
11	<b>Personal and professional development</b>	<p><b>College Students' Beliefs in the Ten-Percent Myth</b>, Kenneth L. Higbee and Samuel L. Clay, <i>Journal of Psychology</i>, September 1, 1998 (Research Methods Unit 1 # 5)</p> <p><b>Can Words Cure Cancer?</b>, Ellen J. Langer, <i>Psychology Today</i>, July 2000 (Communication – Unit 3 # 19)</p>	<b>Team summaries</b>
12	<b>Applying Critical thinking in the real world</b>	<p><b>Critical Thinking and Obedience to Authority</b>, John Sabini and Maury Silver, <i>National Forum</i>, Winter 1985 (Critical thinking – Unit 2 # 8)</p> <p><b>Communication in Workplace Critically Important</b>, Harry Wessel, <i>Knight-Ridder/Tribune Business News</i>, February 12, 2003 (Communication – Unit 1 #1)</p>	
13	<b>Presentations</b>		<b>Presentations</b>
14	<b>Final Examination</b>		<b>News Journal</b>

VIII. Critical thinking websites and references:

Center for Critical Thinking Library  
Accessed on October 10, 2001  
<http://www.criticalthinking.org/university/univlibdir.html>

The Center for Critical Thinking  
Accessed on October 10, 2001  
<http://www.criticalthinking.org/University/univclass/trc.html>

Innumeracy.Com  
Accessed on October 10, 2001  
<http://innumeracy.com/index.htm>

### **Problem Solving:**

Ackoff, Russell L. The Art of Problem Solving. Wiley, 1978.

Arnold, John D. The Complete Problem Solver: A Total System for Competitive Decision Making. New York: John Wiley & Sons, 1992.

Fogler, H. Scott, and Steven E. LeBlanc. Strategies for Creative Problem Solving. Englewood Cliffs, NJ: Prentice-Hall PTR, 1995.

Vos Savant, Marilyn, and Leonore Fleischer. Brain Building in Just 12 Weeks Bantam, 1991.

### **Critical Thinking:**

Andolina, Michael. Practical Guide to Critical Thinking Delmar, 2002.

Baron, Jonathan. Thinking and Deciding. New York: Cambridge University Press, 1994.

Carter, Carol, Joyce Bishop, and Sarah L Kravitz. Keys to Thinking and Learning: Creating Options and Opportunities Prentice-Hall, 2001.

Chaffee, John. Thinking Critically, 6<sup>th</sup> ed. Boston: Houghton Mifflin, 2000.

Epstein, Richard L. Critical Thinking. Belmont, CA: Wadsworth, 1999.

Schick, Theodore, and Lewis Vaughn. How to Think About Weird Things – Critical Thinking for a New Age. McGraw-Hill, 2002

### **Computer Logic Tools And Applications:**

Lamey, Robert. Logical Problem Solving – Before the Flowchart. Prentice-Hall, 2002.

Ooten, Cheryl. Managing the Mean Math Blues. Prentice-Hall, 2003.

Pattis, Richard E. Karel the Robot – A Gentle Introduction to the Art of Programming. Wiley, 1995.

Sprankle, Maureen. Problem Solving and Programming Concepts. Prentice-Hall, 2003.

### **Collegiate Success:**

Chaffee, John. A Thinker's Guide to College Success, 2<sup>nd</sup> ed. Houghton Mifflin, 1999.

Gradowski, Gail, and Joann Snaveley, ed. Designs for Active Learning : A Sourcebook of Classroom Strategies for Information Education. Chicago: American Library Association, 1998.

Hjorth, Linda S. Claiming Your Victories – A Concise Guide to College Success. Houghton Mifflin, 2003.

Kanar, Carol C. The Confident Student. Houghton Mifflin, 2001.

Sherfield, Robert M., Rhonda J. Montgomery, and Patricia G. Moody. Cornerstone: Building on Your Best. Prentice-Hall, 2003.

### **Library Research:**

*National Forum on Information Literacy*. 20 March 2003. Online. Available:  
[http://www.infolit.org/related\\_sites/](http://www.infolit.org/related_sites/). 7 April 2003.

*Information Literacy Web Sites*. 15 February 2002. Online. Available:  
<http://www.oru.edu/university/library/Elites/InformationLiteracy.doc>. 7 April 2003.

### **Formal Logic and Argument:**

Conway, David, and Ronald Munson. The Elements of Reasoning. Toronto: Wadsworth, 2000.

Copi, Irving M., and Carl Cohen. Introduction to Logic. Upper Saddle River: Prentice-Hall, 1998.

Kelly, David. The Art of Reasoning. New York: W.W. Norton, 1994.

Kirby, Gary and Jeffrey R. Goodpaster. Thinking. Prentice-Hall, 2002.

### **Teambuilding:**

Sher, Barbara, and Annie Gottlieb. Teamworks!. New York: Warner Books, 1989.

Verderber, Rudolph F. Working Together. Belmont, CA: Wadsworth, 1982.

### **General/Custom-Published:**

Chaffee, John, et al. Thinking Critically – Communication Strategies and Problem Solving. Houghton Mifflin, 2002.

DeVry-Phoenix Faculty. Critical Thinking: A Guide to Logical Problem Solving. Upper Saddle River: Pearson Publishing Solutions, 1999.

Hjorth, Linda S., John Chaffee, Ben E. Johnson, and Susan Chang. Critical Thinking and Problem Solving. Houghton Mifflin, 2001.



## Appendix I

### Critical thinking definitions

Contributed by Barbara Fowler, Longview Community College.

---

The following are definitions of Critical Thinking according to the people who write textbooks and articles on the subject. While this does not make them automatically correct, it does indicate that they have spent some time thinking about the topic. The best definition for Critical Thinking may well be your own - to help with that task, the best approach to the topic I found was written by **Peter A. Facione, Dean of the College of Arts and Sciences, Santa Clara University**. His article [can be found on the web](#) and ordered for educational purposes for \$0.80. (An order form is at the end of the article.)

---

Critical thinking is deciding rationally what to or what not to believe."

Norris, Stephen P. "Synthesis of Research on Critical Thinking. *Educational Leadership*, v 42 n 8 May 1985. 40-45.

---

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

Halpern, Diane F. *Thought and Knowledge: An Introduction to Critical Thinking*. 1996.

---

Critical thinking is the formation of logical inferences.

Simon and Kaplan, 1989.

---

Critical thinking is the development of cohesive and logical reasoning patterns. Stahl and Stahl, 1991.

---

Critical thinking is careful and deliberate determination of whether to accept, reject, or suspend judgment.

Moore and Parker, 1994.

---

"The purpose of critical thinking is, therefore, to achieve understanding, evaluate view points, and solve problems. Since all three areas involve the asking of questions, we can say that critical thinking is the questioning or inquiry we engage in when we seek to understand, evaluate, or resolve."

Maiorana, Victor P. *Critical Thinking Across the Curriculum: Building the Analytical Classroom*. 1992.

---

Critical thinking skills: understanding the meaning of a statement, judging ambiguity, judging whether an inductive conclusion is warranted, and judging whether statements made by authorities are acceptable.

Smith, 1990.

---

Critical thinking is "the examination and testing of suggested solutions to see whether they will work."

Lindzey, Hall, and Thompson, 1978.

---

"Broadly speaking, critical thinking is concerned with reason, intellectual honesty, and open-mindedness, as opposed too emotionalism, intellectual laziness, and closed-mindedness. Thus, critical thinking involves: following evidence where it leads; considering all possibilities; relying on reason rather than emotion; being precise; considering a variety of possible viewpoints and explanations; weighing the effects of motives and biases; being concerned more with finding the truth than with being right; not rejecting unpopular views out of hand; being aware of one's own prejudices and biases, and not allowing them to sway one's judgment." Kurland, Daniel J. *I Know What It Says . . . What does it Mean?* 1995.

---

Critical thinking is "reasonably and reflectively deciding what to believe or do."

Ennis (1985)

---

Critical thinking is "the art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible."

Paul, Binker, Adamson, and Martin (1989)

---

Critical thinking is "a process which stresses an attitude of suspended judgment, incorporates logical inquiry and problem solving, and leads to an evaluative decision or action."

NCTE Committee on Critical Thinking and the Language Arts.

---

"Critical thinking includes the ability to respond to material by distinguishing between facts and opinions or personal feelings, judgments and inferences, inductive and deductive arguments, and the objective and subjective. It also includes the ability to generate questions, construct, and recognize the structure of arguments, and adequately support arguments; define, analyze, and devise solutions for problems and issues; sort, organize, classify, correlate, and analyze materials and data; integrate information and see relationships; evaluate information, materials, and data by drawing inferences, arriving at reasonable and informed conclusions, applying understanding and knowledge to new and different problems, developing rational and reasonable interpretations, suspending beliefs and remaining open to new information, methods, cultural systems, values and beliefs and by assimilating information."

MCC General Education Initiatives

---

Uses of critical thinking:

"underlies reading, writing, speaking, and listening . . . the basic elements of communication"

"plays an important part in social change . . . institutions in any society - courts, governments, schools, businesses - are the products of a certain way of thinking."

"helps us uncover bias and prejudice."

"is a path to freedom from half-truths and deceptions."

"the willingness to change one point of view as we continue to examine and re-examine ideas that may seem obvious. Such thinking takes time and the willingness to say three subversive words: *I don't know.*"

Critical thinkers: distinguish between fact and opinion; ask questions; make detailed observations; uncover assumptions and define their terms; and make assertions based on sound logic and solid evidence.

Ellis, D. *Becoming a Master Student*, 1997.

---

Attributes of a critical thinker:

- asks pertinent questions

- assesses statements and arguments
- is able to admit a lack of understanding or information
- has a sense of curiosity
- is interested in finding new solutions
- is able to clearly define a set of criteria for analyzing ideas
- is willing to examine beliefs, assumptions, and opinions and weigh them against facts
- listens carefully to others and is able to give feedback
- sees that critical thinking is a lifelong process of self-assessment
- suspends judgment until all facts have been gathered and considered
- looks for evidence to support assumption and beliefs
- is able to adjust opinions when new facts are found
- looks for proof
- examines problems closely
- is able to reject information that is incorrect or irrelevant

Ferrett, S. *Peak Performance* (1997).

---

"Critical thinking is best understood as the ability of thinkers to take charge of their own thinking. This requires that they develop sound criteria and standards for analyzing and assessing their own thinking and routinely use those criteria and standards to improve its quality."

Elder, L. and Paul, R. "Critical Thinking: Why we must transform our teaching." *Journal of Developmental Education* 18:1, Fall 1994, 34-35.

---

### **Definitions of Critical Reading:**

"(1) the process of making judgments in reading: evaluating relevancy and adequacy of what is read . . ." (2) an act of reading in which a questioning attitude, logical analysis, and inference are used to judge the worth of what is read according to an established standard . . . Among the identified skills of critical reading involved in making judgments are those having to do with the author's intent or purpose; with the accuracy, logic, reliability and authenticity of writing; and with the literary forms, components, and devices identified through literary analysis."

Harris and Hodges. (1981). *A Dictionary of Reading and Related Terms*, 74.

---

Critical evaluation is "the process of arriving at a judgment about the value or impact of a text by examining its quality in terms of form, style, and rhetorical features, the readability of the author and the consistency between ideas it presents and the reader's experience, including . . . internal evaluation . . . and external evaluation . . ."

Harris and Hodges. (1995). *The Literacy Dictionary*, 48.

---

Critical readers are:

- willing to spend time reflecting on the ideas presented in their reading assignments
- able to evaluate and solve problems while reading rather than merely compile a set of facts to be memorized
- logical thinkers
- diligent in seeking out the truth
- eager to express their thoughts on a topic
- seekers of alternative views on a topic
- open to new ideas that may not necessarily agree with their previous thought on a topic
- able to base their judgments on ideas and evidence
- able to recognize errors in thought and persuasion as well as to recognize good arguments
- willing to take a critical stance on issues
- able to ask penetrating and thought-provoking questions to evaluate ideas
- in touch with their personal thoughts and ideas about a topic
- willing to reassess their views when new or discordant evidence is introduced and evaluated
- able to identify arguments and issues
- able to see connections between topics and use knowledge from other disciplines to enhance their reading and learning experiences

Schumm, J. S. and Post, S. A. (1997). *Executive Learning*, 282.

## Appendix II

# Bloom's Taxonomy \*

Benjamin Bloom created this taxonomy for categorizing level of abstraction of questions that commonly occur in educational settings. The taxonomy provides a useful structure in which to categorize test questions, since professors will characteristically ask questions within particular levels, and if you can determine the levels of questions that will appear on your exams, you will be able to study using appropriate strategies.

Competence	Skills Demonstrated
<b>Knowledge</b>	<ul style="list-style-type: none"><li>• observation and recall of information</li><li>• knowledge of dates, events, places</li><li>• knowledge of major ideas</li><li>• mastery of subject matter</li><li>• <i>Question Cues:</i> list, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.</li></ul>
<b>Comprehension</b>	<ul style="list-style-type: none"><li>• understanding information</li><li>• grasp meaning</li><li>• translate knowledge into new context</li><li>• interpret facts, compare, contrast</li><li>• order, group, infer causes</li><li>• predict consequences</li><li>• <i>Question Cues:</i> summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend</li></ul>
<b>Application</b>	<ul style="list-style-type: none"><li>• use information</li><li>• use methods, concepts, theories in new situations</li><li>• solve problems using required skills or knowledge</li><li>• <i>Questions Cues:</i> apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover</li></ul>
<b>Analysis</b>	<ul style="list-style-type: none"><li>• seeing patterns</li><li>• organization of parts</li><li>• recognition of hidden meanings</li></ul>

	<ul style="list-style-type: none"> <li>• identification of components</li> <li>• <i>Question Cues:</i> analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer</li> </ul>
<b>Synthesis</b>	<ul style="list-style-type: none"> <li>• use old ideas to create new ones</li> <li>• generalize from given facts</li> <li>• relate knowledge from several areas</li> <li>• predict, draw conclusions</li> <li>• <i>Question Cues:</i> combine, integrate, modify, rearrange, substitute, plan, create, design, invent, what if?, compose, formulate, prepare, generalize, rewrite</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• compare and discriminate between ideas</li> <li>• assess value of theories, presentations</li> <li>• make choices based on reasoned argument</li> <li>• verify value of evidence</li> <li>• recognize subjectivity</li> <li>• <i>Question Cues</i> assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize</li> </ul>

\* Adapted from: Bloom, B.S. (Ed.) (1956) *Taxonomy of educational objectives: The classification of educational goals: Handbook I, cognitive domain*. New York ; Toronto: Longmans, Green.

## **Appendix III**

### **WHAT IS CRITICAL THINKING?**

Critical thinking happens when a learner can do the following three things:

1. Make explicit assumptions about what constitutes legitimate knowledge and how such knowledge comes to be known.
2. Take alternate perspectives on the knowledge being offered so that this comes to be seen as culturally constructed.
3. Undertake positive and negative appraisal of the grounds for, and expression of, this knowledge.

### **HOW DOES ONE DO CRITICAL THINKING?**

Critical thinking is done when one reads or reacts from at least four perspectives - epistemological, experiential, communicative, and political. Each perspective has its own set of questions.

### **WHAT QUESTIONS ARE RELATED TO EACH CRITICAL THINKING PERSPECTIVE?**

#### EPISTEMOLOGICAL:

1. Are the ideas presented already determined by the intellectual paradigm in which the author or presenter works?
2. To what extent are the cultural insights - framed as research findings, theoretical propositions or philosophical injunctions - grounded in documented empirical evidence?
3. To what extent does the piece of literature or presentation seem culturally skewed?
4. To what extent are descriptive and prescriptive fused in an irresponsible and inaccurate way?

#### EXPERIENTIAL:

1. How do the metaphors for practice used in the piece of literature or presentation compare with the metaphors you use in your own practice?
2. What experiential omissions are there in the piece of literature or the presentation that, to you, seem important?
3. To what extent does the piece of literature or presentation acknowledge and address ethical issues in practice?

#### COMMUNICATIVE:

1. Whose voices are heard in the piece of literature or the presentation?
2. To what extent does the author or presenter use a form of specialized language that is unjustifiably distanced from the colloquial language of practitioners?
3. To what extent does the piece of literature or presentation show a connectedness to practice?

POLITICAL:

1. Whose interests are served by the piece of literature of the presentation?
2. To what extent are models of practice ratified?
3. To what extent does the author or presenter depict practice as an individual act?
4. What contribution does the piece of literature or the presentation make to the understanding and realization of democratic forms and processes?

\*Thanks to Steven Brookfield. See "Breaking the Code: Engaging Practitioners in Critical Analysis of Adult Educational Literature", *Studies in the Education of Adults*, 25/1, 1993. pp. 64-91.