



Critical Thinking

The Art of Problem Solving, Argumentation and Being Right!

adapted from *Study and Critical Thinking Skills in College*
by Kathleen T. McWhorter
2003, Addison Wesley Longman

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Words of Francis Bacon

- **Francis Bacon**, describes the essence of critical thinking, back in 1605:
- *For myself, I found that I was fitted for nothing so well as for the study of Truth; as having a mind nimble and versatile enough to catch the resemblances of things . . . and at the same time steady enough to fix and distinguish their subtler differences; as being gifted by nature with desire to seek, patience to doubt, fondness to meditate, slowness to assert, readiness to consider, carefulness to dispose and set in order, and as being a man that neither affects what is new nor admires what is old, and that hates every kind of imposture.*

“A Key Ingredient of College and Life Success!”

- What is a critical thinker?
 - Constantly asks questions
 - Why, how, where, when
 - Isn't satisfied with face value answers
 - Listens and has an open mind
 - Appreciates other viewpoints
 - Collects, evaluates and considers the evidence
 - Where is it from, is it from a valid source or is it just an opinion
 - Uses writing to synthesize and refine the idea(s))

Critical Thinking Skills are used...

- In taking lecture notes
 - What is and is not important, how should you best organize the information, should your note taking methods change with different teachers or subjects? Is there a time when you shouldn't take notes...
 - Critical thinkers plan and adapt
- Studying for exams
 - Planning and selecting what and how to study, asking for clarification

Critical Thinking about Arguments

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- **Step 1: What Is An Argument?**
- For each author you read or lecture you hear, **you must be able to do two things:**
- 1. Identify the specific position taken on a particular issue *and*
- 2. Identify the ways in which support for that position is provided.
- If you can identify 1) *the specific position* and 2) *all the statements that support it*, then you have identified what is called the argument of that position.
- **A. argument = specific position + supporting points (this can be in writing or in an oral form)**

Arguments and Evidence

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A collection of statements is called an **ARGUMENT**.
The supporting statements are referred to as **PREMISES**, and the one supposedly being supported is called the **CONCLUSION**.
An argument, is not just stating a list of separate facts, but is seeking to **JUSTIFY** (show the truth of) one statement by offering the other statements as support for it.
Using Evidence!

Critical Thinking about Arguments

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- **Validity**
- An argument is said to be valid if (and only if), when the premises are all true, the conclusion must be true too.
- Or an argument is valid if and only if there's no way the conclusion can be false without at least one premises being false too.
- The term "Valid" refers to arguments, not to statements. Validity concerns the relationship between the premises and the conclusion, and not the actual truth values of the component statements at all.

Arguments and Evidence

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- Main phases of **CRITICAL THINKING**:
- **RECONSTRUCTION**- extracting an argument from the surrounding mix of statements
- **ASSESSMENT**- decide whether the structure of an argument *really would permit truth to be carried from the premises to the conclusion*.
- **EVALUATION**- activity of judging whether the premises of an argument are true or false, clear or vague, and in need of further defense or not.
- **FALLACY IDENTIFICATION**- complex list of things that may happen in a *persuasion* context, leading to acceptance of some statements without adequate justification.

Levels of thinking (Bloom's Taxonomy)

- Knowledge
 - Recall, repetition
- Comprehension
 - Understanding, using rules
- Application
 - Applying information to something new
- Analysis
 - Examining a relationship, figuring out how things work
- Synthesis
 - Combining knowledge and ideas in a novel manner
- Evaluation
 - Judging and assessing

Question

- Your Turn to Guess . . .
Using the story,
- ***Little Red Riding Hood***:
 1. Illustrate the main idea of the story on a poster.
 2. Rank the characters from best to worst and explain how you ranked them.
 3. Create a new story by placing Red in a modern-day city.

Answer

- Did you answer . . .
 1. Application
 2. Evaluation
 3. Synthesis

Question

- Using the story, ***Little Red Riding Hood***:
 4. Describe what Red did when she first saw the Wolf.
 5. Tell what happened to the grandmother in the story.
 6. Write out the main events in the story. Cut them apart and sequence them in proper order.

Answer

- Did you answer . . .
 4. Comprehension
 5. Knowledge
 6. Analysis

Problem Solving Strategies

- YOU CAN DEVELOP THIS
- Give up excuses such as I am not good at that, or I am not creative
- Think in new ways
- Break old habits
- Make reasoned decisions

Critical Listening

- To be successful you must absorb and learn the information
- Avoid
 - Closed mindedness
 - Selective attention
 - Oversimplification, get the full picture, don't take the easy way out
 - Don't judge the speaker, focus on the content

Critical Participation in Class

- Read ahead
- Prepare for class, know what the topic will be
- Ask critical questions
- Make notes of what you don't understand
- Get involved in class discussions
 - The longer you wait the harder it is
 - Be brief, don't ramble
 - Don't get involved in pointless arguments

Critical Participation

- Watch the teacher and other class members for clues
- Organize your thoughts
- If you are veering away to another topic say so
- Don't interrupt
- Don't talk in class, it hurts your learning and everyone else's, plus it is rude.

Problem Solving

- "a problem occurs when 'what is' is not 'what is desired'." (p. 114)
- 'What is' is the present state
- "What is desired' is the goal state
- You want to go from one to the other
- You will use solution paths
- Sometimes this is just an AHA!
- Usually it requires step by step analysis

Problem Solving

- Some problems are more difficult than others
- Require serious reflection and consideration, don't be impulsive and rush with your solutions
- Ask for help when you are stumped
- Analyze the problem
- Make a list of pros and cons if you can
- Take the problem apart in writing, or use props

Problem Solving Keys

- Think aloud
- Allow time for reflection
- Talk about the problem
- Be creative
- Try to think of all possible solutions
- Compare to similar problems, use your past knowledge to try to solve new ones

Problem Solving in 6 steps

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1. Identify the problem
2. Analyze the problem
3. Formulate solution paths
4. Evaluate all solution paths
5. Choose a solution
6. Evaluate your solution
