Critical Thinking: An Introduction

Objective

- Understand the basic information on critical thinking and problem-based learning
- You will be active participants, not recipients of information
- You will be given problems to solve, and your success in problem solution will be the focus of attention and evaluation
- We will be concerned primarily with process, not just achievement

What is critical thinking?

- Commonly called “problem solving”
- Not being content with the first solution to a problem, but thinking more deeply about it.
- Knowing, understanding, analyzing, synthesizing, applying and evaluating the idea or problem
- Looking for what is implied in a question rather than what is stated
- Applying the rules of logic to problem solving
- Not letting reason be clouded by emotion

The pathway to trust is paved in Light

Four Aspects of Critical Thinking

- **Abstract Thinking:**

  thinking past what your senses tell you
- **Creative Thinking:**

  thinking "out of the box," innovating
- **Systematic Thinking:**

  organizing your thoughts into logical steps
- **Communicative Thinking:**

  being precise in giving your ideas to others.

Don't let sloppy thinking put you in the Squeeze

Critical Thinking: What is involved?

- **Question:** what is being asked?
- **Purpose:** why do I want the answer?
- **Point of View:** where do I stand to look at the question?
- **Information:** what data do I have?
- **Concepts:** what ideas are involved?
- **Assumptions:** what am I taking for granted?
- **Inferences:** what conclusions am I drawing?
- **Consequences:** what are the implications of my question?

WHO – WHEN- HOW- WHERE- WHY- WHAT

Critical Thinkers

- Acknowledge personal limitations.
- See problems as exciting challenges.
- Have understanding as a goal.
- Use evidence to make judgments.
- Are interested in others' ideas.
- Are skeptical of extreme views.
- Think before acting.
- Avoid emotionalism
- Keep an open mind

Elementary, my dear thinker….

Uncritical Thinkers

- Pretend to know more than they do.
- Get annoyed by problems.
- Are impatient.
- Judge on first impressions and intuition.
- Focus on their own opinions.
- Look only for ideas like their own.
- Are guided by feelings rather than thoughts.
- Claim that thinking gives them a headache.

Characteristics of Critical Thinkers

Critical thinkers:

- Care that their beliefs be true and that their decisions be justified; that is, care to "get it right“ to the extent possible. This includes the dispositions to
  - Seek alternative hypotheses, explanations, conclusions, plans, sources, etc.,and be open to them
  - Endorse a position to the extent that, but only to the extent that, it is justified by the information that is available
  - Be well informed
  - Consider seriously points of view other than their own

Characteristics II

Critical thinkers:

❑Care to present a position honestly and clearly, theirs as well as others'. This includes the dispositions to

- ❑ Be clear about the intended meaning of what is said, written, or otherwise communicated, seeking as much information and precision as the situation requires
- ❑ Determine, and maintain focus on, the conclusion or question
- ❑ Seek and offer reasons for their opinions/conclusions
- ❑ Take into account the total situation
- ❑ Be reflectively aware of their own basic beliefs

Characteristics III

Critical thinkers:

- Care about others' point of view and treat it with respect. They:
  - Discover and listen to others' views and reasons
  - Avoid intimidating or confusing others, taking into account others' feelings and level of understanding
  - Are concerned about others' welfare
  - Are concerned about educating others on the issues

Steps in Critical Thinking: Formulating your argument

- Focus on a question
  - Identify and formulate the question
  - Develop criteria for judging possible answers
  - Develop a plan for collecting data
- Develop an argument
  - Generate premises and conclusions (the “whereas” and “therefore”)
  - Develop reasoning steps/support for conclusions (the “why”)

Steps in Critical Thinking: Deconstructing your Argument

- Analyze arguments
  - Identify conclusions
  - Identify unstated reasons (assumptions)
  - Identify stated reasons
  - Identify and handle irrelevance
  - See the structure of an argument
  - Summarize

Steps in Critical Thinking: Clarifying Arguments

Ask and answer questions of clarification and/or challenge, such as:

- Why?
- What is your main point?
- What do you mean by…?
- What would be an example?
- What would be an exception?
- How does that apply to this case (describe a case, which might well appear to be a counter example)?
- What difference does it make?
- What are the facts?
- Is this what you are saying: _____?
- Would you say some more about that?

Steps in Critical Thinking: Knowing/Analyzing Sources

- Judge the credibility of a source. Major criteria (but not necessary conditions):
  - Expertise
  - Lack of conflict of interest
  - Agreement among sources
  - Reputation or risk to reputation
  - Use of established procedures
  - Ability to give reasons

Steps in Critical Thinking: Knowing the Basis for Decisions

- Example: guilt or innocence of an accused criminal defendant
  - Is the evidence physical or circumstantial? How good is the evidence? Were there eyewitnesses? How reliable are they?
  - Direct observations are strong evidence because:
  - Minimal inference involved
  - Short time interval between observation and report
  - Report by the observer, rather than someone else (that is, the report is not hearsay, and can be verified)
  - Corroboration or possibility of corroboration
  - Good access to actual physical evidence
  - Competent employment of technology, if technology is useful
  - Satisfaction by observer (and reporter, if a different person) of credibility criteria

Inference

- Induction: moving from specific to general (arguments based on observation or experience)
- Deduction: moving from general to specific (arguments based on laws, rules, or widely-accepted principles)

Types of Explanatory Conclusions

- Causal claims ("Treatment X causes improvement in strength and mobility")
- Claims about the beliefs and attitudes of other people ("The American people want security more than prosperity")
- Interpretation of others' intended meanings ("She is always late, so she must not really want to do this")
- Historical claims that certain things happened ("He woke up in a bathtub of ice, missing a kidney")

Getting the Data

- Designing experiments, including planning to control variables
- Seeking evidence and counterevidence
- Seeking other possible explanations
- Evaluating the strength of available evidence, with a focus on methodology

Judging Conclusions

- The proposed conclusion would explain the evidence
- The proposed conclusion is consistent with all known facts
- Competitive alternative explanations are inconsistent with facts
- The proposed conclusion seems plausible (less important than 1-3)

Ask Testable Questions

- Do infants dream?
- Does caffeine make people anxious?
- Are some people born evil?
- Does smoking lead to lung cancer?
- Are dreams an indication of our unconscious desires and conflicts?
- Is physical therapy beneficial?

Causal Arguments

- Truck, bicycle, and car example
- What causes the accident?
- The “one significant difference” idea (inductive)
- Two important rules:
- Cause must precede the effect in time
- Correlation does not prove causation.

Inference	A judgment based on evidence
Plausible	Logical and believable, credible
Validity	Truthful, well-founded
Claim	To assert as a fact whether it is or not
Fact	A truth that cannot be disputed
Opinion	A personal view or belief
Argument	A set of claims to support an assertion
Assumption	An inference that is believed to be true

Inductive and Deductive Reasoning

- Inductive Reasoning

Specific Reasoning → Broad Principles

Example: My history class requires a lot of reading → All college courses have a lot of reading

- Deductive Reasoning

Broad Generalizations → Specific Conclusions

Example: All college courses are hard → My art history course will be hard

The IDEAL Method

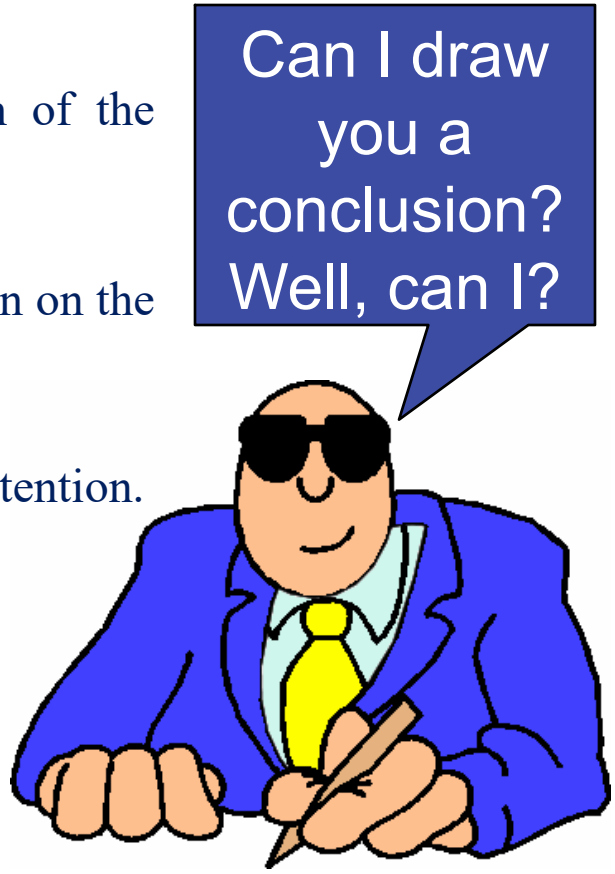
- Identify the problem.
- Define the problem.
- Explore alternative approaches.
- Act on the best strategies.
- Look back to evaluate the effects.

Ask Questions

- One quality of a good critical thinker is the ability to ask on-target questions.
- If you don't usually ask questions, is it because you
  - Fear embarrassment?
  - Worry what others will think of you?
  - Worry that the instructor will think your question is strange?
  - Worry that others will think you're showing off?
- When you don't ask questions, you sacrifice your education.
- If you don't take risks, you won't get the maximum benefit in developing your mind.

There's No Such Thing as a Stupid Question (Usually)

- There are unwelcome questions.
- Don't ask questions that detract from the momentum of the class.
- Don't ask questions that focus more on self-concerns than on the needs of the class.
- Don't ask questions that demonstrate you failed to pay attention.
- Don't ask silly questions.



Offer Criticism

- You will most likely be asked to judge or evaluate issues in college.
- First decide whether you like what you are being asked to judge.
- Consider both positive and negative attributes.
- Use examples to support your judgment.
- Don’t be intimidated by this kind of assignment; your instructors want you to develop your critical thinking skills.

Make the Right Inferences

- You are constantly making inferences.
- Inferences are interpretations that you derive from processing cues in a situation.
- A plausible inference is a judgment that is logical, and possibly accurate.
- Sometimes inferences become assumptions— something we believe to be true and act on as though it were.
- Inferences can be tricky. It is easy to be wrong and you may operate on faulty assumptions until you are informed otherwise.

Your inference shows a profound grasp of the obvious..

Four Common Decision Making Problems

- Snap decisions
  - Don’t jump to conclusions!
- Narrow thinking
  - Broaden your vistas!
- Sprawling thinking
  - Don’t beat around the bush!
- Fuzzy thinking
  - Keep it sharp! Keep it relevant!

What is a Claim?

- A claim is a statement which can be either true or false, but not both.
- A claim is an assertion you want to have accepted as a fact and not be disputed.
- When evaluating a claim, you have three choices:

- accept the claim
- reject the claim
- suspend judgment until you have more information

What is an Argument?

WHAT IS AN ARGUMENT

- An argument is a set of claims.
- Arguments begin with premises and lead to a conclusion
- A good argument is one in which the premises lead logically to a strong or valid conclusion.

Know Your Own Biases

- Everyone has strong preferences and prejudices that may prevent us from evaluating arguments fairly.
- Acknowledging these can increase the likelihood of coming up with more effective arguments.
- Good reasoners guard against their own “soft spots” to increase their objectivity.
- Be honest with yourself: “Am I opinionated?

Know thyself : The truth shall make you free.

Refine Your Reasoning

- Be willing to argue
- Use deductive reasoning
- Check your assumptions
- Know your own biases
- Observe carefully
- Stay positive and persistent
- Show concern for accuracy
- Take time before concluding

Nurture Your Own Creativity

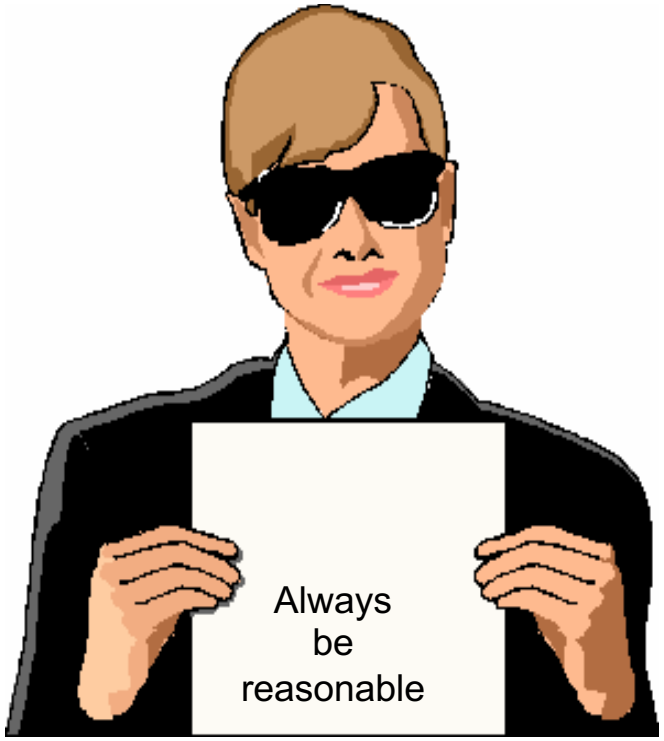
- Don’t accept other people’s blueprints.
- Be vigilant about what others can’t see.
- Differentiate the good from the bad.
- Take the plunge before you’re an expert.
- Concentrate on the big picture.
- Take sensible risks.
- Motivate yourself from inside.
- Shape environments that will support your creativity.
- Actively pursue your creative life.

If you don’t grow it, who will?

Critical Thinking:
A Skill to Carry You Through Life

Professors and future employers value your ability to perform these critical thinking skills:

- Manage and interpret information
- Examine exciting ideas and develop new ones
- Pose logical and cogent arguments
- Recognize reliable evidence
- Be proactive rather than reactive
- Think things through in depth.



Why College Encourages Critical Thinking

Remember:

- Thinkers are generally "movers and shakers."
- Sometimes how you solve a problem is as important as the solution.
- Open ended questions of "Why?", "How?" or "What If?" have no simple, clear-cut answers.
- There are many valid points of view!
- The greatest gift a college can give you is an open mind.

As blood **is** to **the brain**
Thinking is to the mind