

Critical-ThinkingSkills

EthicsandComputing Chapter2

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Motivation

- Goodcritical -thinkingskillsareessential forclearerthinking,betterdecision -making, andbettercommunicationwithothers
- Goodcritical -thinkingskillsarea prerequisite to carrying out the intention to actethically

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Critical Thinking

- “The process of evaluating a claim for the purpose of deciding whether to accept, reject or perhaps suspend judgment about it” [Damer, *Attacking Faulty Reasoning*, 1987]
- “The ability and desire to ask the right questions in analyzing a situation” [Browne and Keeley, *Asking the Right Questions: A Guide to Critical Thinking*, 1990]

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Critical Questions [Browne & Keeley]

1. What are the issues and the conclusions?
2. What are the reasons?
3. What words or phrases are ambiguous?
4. What are the value conflicts and assumptions?
5. What are the descriptive assumptions?
6. What is the evidence?

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Critical Questions [Browne & Keeley]

7. Are the samples representative and the measurements valid?
8. Are there rival hypotheses?
9. Are there flaws in the statistical reasoning?
10. How relevant are the analogies?
11. Are there errors in reasoning?

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Critical Questions [Browne & Keeley]

12. What significant information is omitted?
13. What conclusions are consistent with the strong reasons?
14. What are my own value preferences in this controversy?

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Argument

- Premises
- Conclusions
- Valid argument
 - ◆ All premises are true
 - ◆ All premises relevant to conclusion
 - ◆ Premises sufficient to establish truth of conclusion

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Logical Fallacies

1. Errors arising from ambiguity
2. Circular arguments that beg the question
3. Use of unwarranted assumptions
4. Missing evidence
5. Incorrectly identified causation
6. Premises irrelevant to the stated conclusion

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Logical Fallacies

7. Irrelevant appeal to emotion, authority, loyalty,...
8. Diversion from the main point
9. Incorrect deductive inference

Errors Arising from Ambiguities

- Ambiguous words
 - ◆ “If all men are created equal, then why are some people so rich.”
- Ambiguous syntax
 - ◆ “Computer comes with 128MB RAM, 30GB hard drive, printer and monitor sold separately.”

Errors Arising from Ambiguities

- Selective placement of emphasis on words
 - ◆ “Of these three computer models, I have never seen *that* one fail.”
- Selective wording
 - ◆ “As far as I know, Joe Smith does not use drugs.”
 - ◆ “Joe Smith was never caught using drugs at work.”

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Circular Arguments that Beg the Question

- Premise is a disguised form of the conclusion
 - ◆ Since X is true, therefore X is true.
 - ◆ “I think, therefore I am.”

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Use of Unwarranted Assumptions

- Part/whole assumptions
 - ◆ If each part possesses some trait, their combination does not necessarily possess that trait
 - ◆ If the whole possesses some trait, not every part necessarily possesses that trait

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Use of Unwarranted Assumptions

- Either/Or assumptions
 - ◆ There may be a middle ground
- Split the difference
 - ◆ Middle ground may not make sense
- Σ negligible = negligible
- Poor use of analogies
 - ◆ Similarity at one level does not imply similarity at every level

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Missing Evidence

- Generalizing from small or biased experience
- Contrary to fact
 - ◆ Reason based on alternative reality
- Lack of evidence against does not imply conclusion
- Measures of vague concepts

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Incorrectly Identified Causation

- Order does not imply causation
- Confusing the cause with the effect
 - ◆ Identifying one effect as the cause of other effects with common cause

Since Jane and John had lunch yesterday, and
Jane was selecting the news sales manager, and
John was named the news sales manager today,
Therefore Jane likes to give promotion to those she
socializes with

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Incorrectly Identified Causation

- Oversimplifying the cause
- Inappropriately emphasizing one cause among others
- One step in a particular direction must lead to additional steps in that direction (domino fallacy or slippery slope)
- Luck is not a valid cause (gambler's fallacy)
 - ◆ "My luck has to change soon."
 - ◆ "If we bid on enough projects, one of them has to come through."

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Premises Irrelevant to the Stated Conclusion

- Rationalization
- Attacking the person's motivations, not their argument
- Ad hominem attack on a person
 - ◆ "John proposes X, but John is a bad person; therefore, we should not do X."
- "You do it too"

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Irrelevant Appeals to Emotion, Authority, Loyalty, ...

- Arguments based on prevailing opinion
- Appeals based on flattery or group identification
- Other appeals based on
 - ◆ Intimidation or threat
 - ◆ Tradition
 - ◆ Irrelevant or questionable authority

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Diversion from the Main Point

- Straw person arguments
 - ◆ “More employees means small raises.”
- Red herring
 - ◆ “The parking situation is terrible.”
- Joke about or ridicule the opposing point
- Trivial objection to an argument

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Incorrect Deductive Inference

- Categorical syllogisms (correct)

Since all dogs are animals, and
no plant is an animal,
Therefore no dog is a plant

Incorrect Deductive Inference

- Hypothetical reasoning (correct)

Since If X, then Y, and
X,
Therefore Y.

Incorrect Deductive Inference

- Denying the antecedent (incorrect)

Since If X, then Y, and
 not X,
Therefore not Y.

Incorrect Deductive Inference

- Affirming the consequent (incorrect)

Since If X, then Y, and
 Y,
Therefore X.

Case Study I: Workplace Privacy

- Technician discovers pornography on PC used by dean of Harvard School of Divinity (1998)
 - ◆ Dean's home PC
 - ◆ Pornography explicit, but not illegal
 - ◆ Discovered by technician while working on PC
 - ◆ Should technician report to Harvard?

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Case Study I: More Information

- Dean's home PC owned by Harvard
- No policy regarding expected privacy
 - ◆ Many companies actively review employee files and e-mail
- Policy does prohibit inappropriate or obscene material on Harvard computers
- Should technician report to Harvard?
- What if the discovery was an e-mail that the dean had tested HIV positive?

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Case Study I: Argument

- Since
 - ◆ What the dean does legally and in private is his own business
 - ◆ The dean's use of pornography was legal and private
- Therefore
 - ◆ It is none of the university's business

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Case Study I: Aftermath

- Harvard president meets with dean
- Dean resigns
- News story appears in *Boston Globe* in May 1999
- Other tidbits
 - ◆ The technician was female
 - ◆ She supposedly took the story to the newspaper

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Case Study I: Other Arguments

- “The episode raises questions about the right to privacy and questions about punishing people because they have interests in sexual images.” ACLU attorney
- Computer technicians are like doctors and should have a Hippocratic oath

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Case Study II: Disseminating Copyrighted Material

- David LaMacchia, 20-year-old CSE major at MIT
- Set up a computer bulletin board called “cynosure”
- Became known as a place to post and obtain copyrighted software
- LaMacchia accused of transmitting stolen property by U.S. Attorney’s Office

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Case Study II: Result

- U.S. District Court cited *Dowling vs. U.S.* case on bootlegged Elvis Presley records
- Judge felt that LaMacchia's actions were wrong, but not criminal
- What do you think?

Points to Remember

- Good critical-thinking skills are essential to clear thinking, better decision making, and better communication with others.
- Good critical-thinking skills are a prerequisite to reason and act ethically