MAGNA ONLINE SEMINARS

Supplemental Materials

Teaching Critical Thinking to Students: How to Design Courses That Include Applicable Learning Experiences, Outcomes, and Assessments

Presented by:

Linda B. Nilson, PhD

Linda B. Nilson is director emerita of the Office of Teaching Effectiveness and Innovation (OTEI) at Clemson University. She wrote The Graphic Syllabus and the Outcomes Map: Communicating Your Course (Anker/Jossey-Bass, 2007), Creating Self-Regulated Learners: Strategies to Strengthen Students' Self-Awareness and Learning Skills (Stylus, 2013), and Specifications Grading: Restoring Rigor, Motivating Students, and Saving Faculty Time (Stylus, 2015). Her next book, Online Teaching at Its Best (now in its fourth edition), with co-author Ludwika A. Goodson, is in progress for Jossey-Bass. She is also beginning a book on discussion with Jennifer Herman for Stylus.

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DISCIPLINE-RELEVANT CT SKILLS/OUTCOMES

Common CT Skills/Outcomes/Assessments in the Basic and Applied Sciences (Natural and Physical Sciences, Psychology, and Social Sciences)

Which fit your prospective CT course?
- Interpret quantitative relationships in graphs, tables, charts, etc.
- Analyze situations/data to identify and clearly articulate issues/problems/questions.
- Identify and summarize an issue/problem/question and/or the source's position.
- Categorize problems to identify the appropriate algorithms.
- Organize and integrate information/data to solve a problem or resolve an issue.
- Assess alternative solutions and implement the optimal one(s).
- Explain how new information can change the definition of a problem or its optimal solution.
- Evaluate hypotheses and conclusions for consistency with established facts.
- Develop, justify, and explain the limitations of one's own hypotheses, interpretations, positions, or conclusions as well as those of others.
- Identify, analyze, and evaluate key assumptions and the influence of context.
- Evaluate the appropriateness of procedures for investigating a question of causation.
- Evaluate data for consistency with established facts, hypotheses, or methods.
- Separate factual information from inferences.
- Separate relevant from irrelevant information.
- Identify and articulate alternative positions/interpretations of the data or observations.
- Evaluate competing causal explanations.
- Explain the limitations of correlational data.
- Explain the limitations of a data-based position or conclusion.
- Identify and evaluate implications.
- Identify new information that might support or contradict a hypothesis.

Any other CT skills/outcomes/assessments for your scientific field?
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Common CT Skills/Outcomes/Assessments in Technical/Problem Solving Fields
(in addition to some of the above)

Which fit your prospective CT course?
- Separate relevant from irrelevant info.
- Analyze situations/data to identify problems.
- Categorize problems to identify the appropriate algorithms.
- Integrate information/data to solve a problem.
- Assess alternative solutions and implement the optimal one(s).
- Explain how new info can change the definition of a problem or its optimal solution.
- Assess different problem definitions, and conclusions in terms of cost, time, and client preferences.

Any other CT skills/outcomes/assessments for your technical/problem-solving field?
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Common CT Skills/Outcomes/Assessments in Rhetorical Fields
(humanities, some areas in social sciences)

Which fit your prospective CT course?
- Determine the relevance of information for evaluating an argument or conclusion.
- Separate facts from opinions and inferences.
- Locate and use primary and secondary sources to conduct research.
- Recognize flaws, inconsistencies, and logical fallacies in an argument.
- Evaluate competing interpretations, explanations, evidence, and conclusions.
- Analyze and develop explanations for historical and contemporary issues, trends, and problems.
- Communicate complex ideas effectively.

Any other CT skills/outcomes/assessments for your rhetorical field?
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Common CT Skills/Outcomes/Assessments Distinctive to the Arts

Which fit your prospective CT course?

- Identify alternative artistic interpretations.
- Determine how well an artistic interpretation is supported by evidence contained in a work.
- Recognize the salient features or themes in works of art.
- Evaluate work of art according to accepted criteria.
- Distinguish between objective and subjective analysis and criticism in specific examples.
- Conduct objective and subjective analyses of a piece of work.
- Compare and contrast different works to provide evidence of change or growth through history, across cultures, across locations, or in a particular artist.
- Infer the historical context (time, place, artist, motivation, etc.) of a work of art from its characteristics, and justify one's inference.
- Create a respectable piece of art.

Any other CT skills/outcomes/assessments for your art field?

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Examples of Questions/Tasks to Give Students Practice in CT Skills

What is your interpretation, and how did you decide on it?

What is the central problem?

Is this statement fact or opinion, and why?

How would you compare and contrast these concepts/claims?

What is the hypothesis in this study?

How credible is the source?

How strong are the arguments? What are some counter-arguments?

Why is there disagreement about this issue?

Can you find any errors in reasoning (logical fallacies, faulty statistical or scientific reasoning)? If so what are they?

How good is the evidence? Or: How good are the data?

What conclusions can you draw?

Why did you come to this conclusion?

What assumptions are you making to come to that conclusion?

What are the implications of this conclusion?

What other conclusions might flow from the evidence?

How confident are you in your conclusions, and why?

What additional data do you need to answer this question?

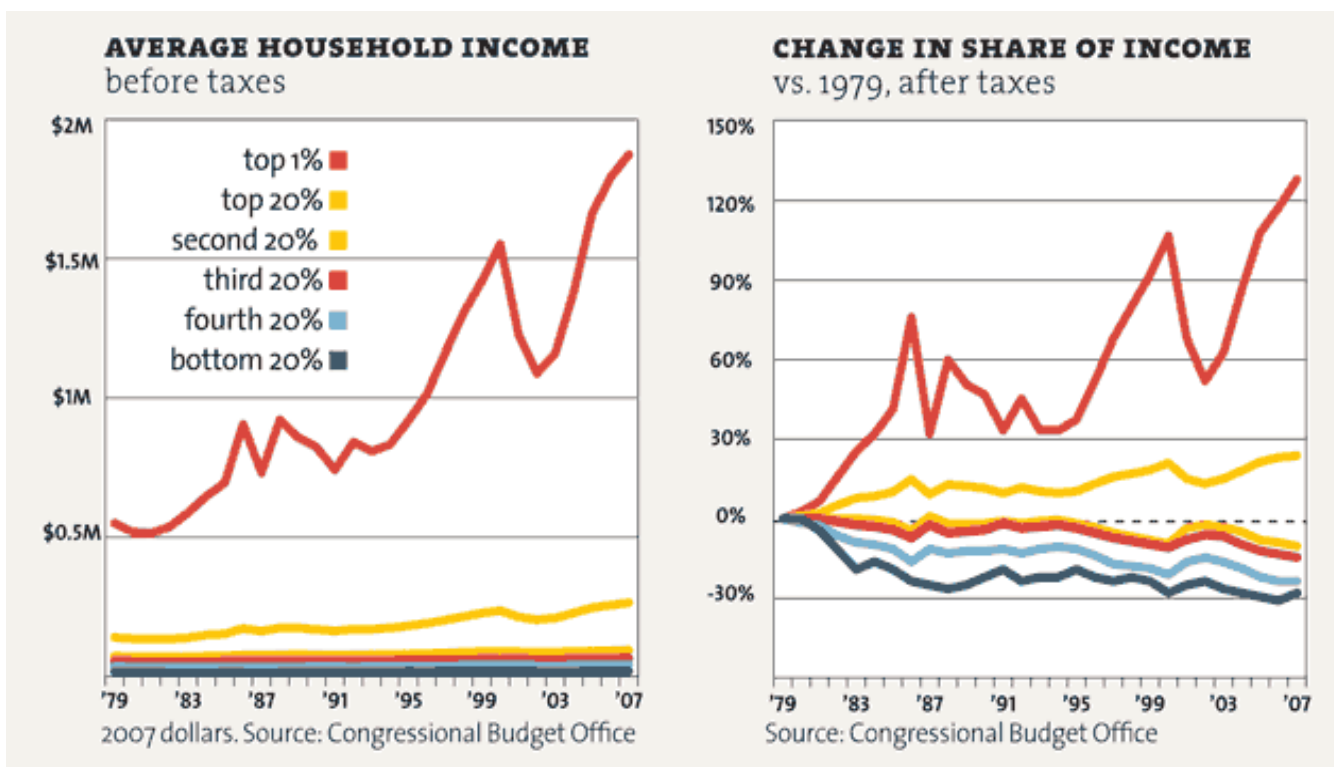What are some other possible explanations?

How did you reason out this issue?

Why do you think that was the best answer/solution?

What can you predict from the data/evidence?

How do you know whether the relationship is causal or spurious?

What patterns in the data can you recognize?

AVERAGE HOUSEHOLD INCOME
before taxes

top 1%
top 20%
second 20%
third 20%
fourth 20%
bottom 20%

2007 dollars. Source: Congressional Budget Office

CHANGE IN SHARE OF INCOME
vs. 1979, after taxes

Source: Congressional Budget Office

The following item is **multiple true/false**. To the left of each statement, put "T" if it is true and "F" if it is false.

Which of the following statements is/are valid conclusion(s) you can draw from the graphs above:

___ 1. Because the share of income dropped for most households, the U.S. economy has less money flowing through the system.

___ 2. From 1979 to 2007, the change in the share of income dropped for all but the top 1%.

___ 3. In terms of income, both the top 20% and top 1% benefited from the bull market in technology.

___ 4. The graphs supply evidence in support the trickle-down theory that President Ronald Reagan espoused.

___ 5. The graphs supply evidence of increasing polarization between the highest-income classes and the rest of society.

___ 6. The graphs supply evidence that the wealth of the bottom 80% dropped from 1979 to 2007.

Possible Reflective Meta-Assignments

Because critical thinking requires awareness, monitoring, and evaluation of one's thinking, add a ***meta-assignment*** or ***assignment wrapper*** (grade pass/fail) in which students reflect on, abstract, and describe their thinking and affective processes.

- *How did you arrive at your response/solution?*
- *How did you define the task/problem?*
- *How did you decide which principles and concepts to apply to the task/problem?*
- *How did you develop alternative approaches and solutions to the task/problem and assess their feasibility, trade-offs, and relative worth?*
- *How did you conduct your design/problem-solving/research process (steps, strategies, problems encountered, how overcome)?*
- *What skills did you use or improve?*
- *Evaluate your strategies and performance in achieving your goals.*
- *What goals and strategies will guide your revision (if applicable)?*
- *What learning value did this task have? What would you do differently?*
- *What part of the learning experience challenged what you thought about the subject? Did you find yourself resisting it? If so, how did you overcome your resistance?*
- *What advice would you give the next cohort of students before they do this assignment (approach, strategies, problems, value)?*

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Many teaching resources are available free at www.criticalthinking.org, such as:
http://www.criticalthinking.org/pages/our-concept-and-definition-of-critical-thinking/411
http://www.criticalthinking.org/pages/a-sample-assignment-format/438
http://www.criticalthinking.org/pages/critical-thinking-development-a-stage-theory/483
http://www.criticalthinking.org/pages/how-to-study-and-learn-part-three/515
http://www.criticalthinking.org/pages/the-state-of-critical-thinking-today/523
http://www.criticalthinking.org/pages/universal-intellectual-standards/527
http://www.criticalthinking.org/pages/valuable-intellectual-traits/528)
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Critical thinking rubrics online:
- AACU's Critical Thinking VALUE Rubric at http://www.aacu.org/value/rubrics/critical-thinking and http://assessment.arizona.edu/sites/default/files/CriticalThinking.pdf
- St. Philip's College QEP Critical Thinking Rubric at http://course1.winona.edu/shatfield/air/QEPrubricpilots042007jo.pdf
- Facione & Facione's Holistic Critical Thinking Scoring Rubric at http://course1.winona.edu/shatfield/air/critical%20thinking%204.pdf
- Northeastern Illinois University's General Education Critical Thinking Rubric at http://course1.winona.edu/shatfield/air/Critical%20Thinking-long.pdf
- The College of Wooster's Critical Thinking Sample Rubrics, Domain Specific http://www3.wooster.edu/teagle/critical_rubrics.php
- St. Petersburg College's Assessment Rubric for Critical Thinking (ARC) Scenarios http://www.spcollege.edu/criticalthinking/students/rubrics.htm

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