Critical Thinking

It's Not What You Think!

Drexel Assessment Conference, 2017
Competencies of the 21st Century Learner

Communication

Critical Thinking

Collaborative Problem Solving

Creativity

McCarthy, B. (2012). *The learning cycle, the 21st century and millennial learners: Who they are and how to teach them.*
Critical Thinking Skills

Student Skills
Ability to understand expert information
   Ability to grasp the essence
   Ability to examine assumptions
Ability to understand the connections to other concepts

Reflection & Conceptualization
Critical Thinking Skills

Students’ Relationship to Content
Belief/Skepticism regarding evidence criteria
Agreement/Disagreement with expert reasoning
Willingness/unwillingness to revise perspectives
Openness to new values/reinforcement of current values

Reflection & Conceptualization

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Teaching and assessing critical thinking…

• How do we measure critical thinking?
• Where do we measure critical thinking?
• What do we measure as critical thinking?
• When do we teach critical thinking?
• Who should teach critical thinking?
Critical Thinking as Part of Learning Outcomes

- CORE INTELLECTUAL AND PRACTICAL SKILLS
- EXPERIENTIAL AND APPLIED LEARNING

- **WE ALL HAVE THE OUTCOME- HOW DO WE PROPERLY DEFINE AND ASSESS CRITICAL THINKING?**
Semantics

• Teaching critical thinking skills.
• Teaching in a critical manner.
• Metacognition as critique.
• Critical thinking vs. thinking critically.
• Reflective thinking – critical thinking?
• Critical thinking – the “what?” of things
Bloom’s Taxonomy of Thinking Skills

- Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create

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Learning Objectives: Bloom’s Analysis

TABLE 1
A Sample of Learning Objectives for a Financial Statement Analysis

<table>
<thead>
<tr>
<th>Level</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Identify two basic approaches to financial statement analysis</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Compare and contrast horizontal and vertical financial analysis.</td>
</tr>
<tr>
<td>Application</td>
<td>Perform a ratio analysis of a company for the most recent fiscal year.</td>
</tr>
<tr>
<td>Analysis</td>
<td>Compare the financial ratios of a company to industry averages and give possible reasons for any significant variances.</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Based upon financial analysis, identify several actions a company might take to improve its operating results.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>In the role of a potential lender, prepare a memorandum to your supervisor assessing the overall liquidity and solvency of a prospective borrower, your recommendation to extend or deny credit, and any significant assumptions made or limitations of the data you utilized in formulating your recommendation.</td>
</tr>
</tbody>
</table>
4MAT Model of Teaching and Learning

Teaching in a critical manner is essential for:

- Skilled reading, writing, speaking, and listening;
- Skilled reasoning within all subject areas;
- Skilled decision-making and problem-solving in all parts of life;
- Skilled analysis and evaluation of one’s emotions and values;
- Intelligent choices in human relationships;
- Skilled decision-making in the workplace and in civic engagement.
Paul-Elder Critical Thinking Model

• Critical thinking is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fair-minded way.
Paul-Elder Framework for Critical Thinking

1. Identify goals and purposes.
2. Gather relevant information.
3. Formulate questions clearly and precisely.
Paul-Elder Framework for Critical Thinking (cont.)

4. Determine the assumptions they (and others) are using and analyze those assumptions for justifiability.

5. Think through the implications of the decisions they (and others) make, and the solutions they come to.
Paul-Elder Framework for Critical Thinking (cont.)

6. Make logical and accurate inferences and interpretations.
7. Articulate the concepts or ideas guiding their thinking (and the thinking of others).
8. Consider alternate ways of looking at problems and situations.

http://www.criticalthinking.org/
Paul-Elder Model of Critical Thinking and Teaching

FIGURE 1
5-Step Model to Move Students toward Critical Thinking

Step 1: Determine learning objectives
- Define behaviors students should exhibit
- Target behaviors in higher order thinking

Step 2: Teach through questioning
- Develop appropriate questions
- Employ questioning techniques
- Encourage interactive discussion

Step 3: Practice before you assess
- Choose activities that promote active learning
- Utilize all components of active learning

Step 4: Review, refine, and improve
- Monitor class activities
- Collect feedback from students

Step 5: Provide feedback and assessment of learning
- Provide feedback to students
- Create opportunities for self-assessment
- Utilize feedback to improve instruction

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Richard Paul’s Critical Thinking Model

http://www.criticalthinking.org/ctmodel/logic-model1.htm

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Departmental Self-Evaluation

- **Model Description**

  Students successfully completing a major in ____ will demonstrate a range of ____ thinking skills and abilities which they use in the acquisition of knowledge. Their work at the end of the program will be clear, precise, and well-reasoned. They will demonstrate in their thinking command of the key _____ terms and distinctions, the ability to identify and solve fundamental ____ problems. Their work will demonstrate a mind in charge of its own ____ ideas, assumptions, inferences, and intellectual processes. They will demonstrate the ability to analyze ____ questions and issues clearly and precisely, formulate ____ information accurately, distinguish the relevant from irrelevant, recognize key questionable ____ assumptions, use key ____ concepts effectively, use ____ language in keeping with established professional usage, identify relevant competing ____ points of view, and reason carefully from clearly stated ____ premises, as well as sensitivity to important ____ implications and consequences. They will demonstrate excellent ____ reasoning and problem-solving.

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Your Turn

• Apply Paul-Elder Process to an activity or assignment.
  • See sample: http://www.criticalthinking.org/pages/a-sample-assignment-format/438
  • Apply to your discipline
Expand Critical Thinking
Place of *Critical Thinking* in College Learning

- Reflective Thinking
- Creative Thinking
- Analytical Thinking
- Ethical Thinking
- Informed Thinking
- Transformational Thinking

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Assessing *Critical Thinking* in College

- Evidence of critical thinking in Problem-Based Learning:
  - [http://cll.mcmaster.ca/resources/pbl.html](http://cll.mcmaster.ca/resources/pbl.html) (McMaster Theory)
  - [http://www1.udel.edu/inst/](http://www1.udel.edu/inst/) (University of Delaware – PBL repository)

- AAC&U VALUE Rubrics: Integrative Learning, Critical Thinking, Creative Thinking, Quantitative Literacy, Inquiry & Analysis, Ethical Reasoning, Problem Solving
Evidence of Learning: Critical Thinking

• Case Study analysis in the classroom.
• Using Problem-Based Learning, student is asked to solve a problem identified in a given case study, using the protocol of critical thinking. The problem must be open-ended.
  • The student submits a written response.
  • OR A class team is asked to address the given problem and presents the analysis as an oral presentation.
Problem Based Learning

- University of Delaware
  http://www.udel.edu/inst/resources/sample-problems.html

- University of Texas
  http://learningsciences.utexas.edu/teaching/flipping-a-class

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How to Assess Critical Thinking

- AAC&U Critical Thinking Rubric
- Competencies:
  - Explanation of issue(s), Evidence, Influence of context and assumptions, Student's position (perspective, thesis/hypothesis), Conclusions and related outcomes (implications and consequences)
Assessing critical thinking

Reflective practices

• AAC&U VALUE Rubrics
  • Integrative Learning
  • Integrative learning is an understanding and a disposition that a student builds across the curriculum and co-curriculum, from making simple connections among ideas and experiences to synthesizing and transferring learning to new, complex situations within and beyond the campus.
  • http://www.aacu.org/value/rubrics/integrative-learning
Assessing critical thinking

Capstone: Learning Experiences and Transformation

Transformational Learning: Reflective Thinking

Transformative learning theory says that the process of "perspective transformation" has three dimensions: psychological (changes in understanding of the self), convictional (revision of belief systems), and behavioral (changes in lifestyle).

REFLECT Rubric

http://journals.lww.com/academicmedicine/abstract/2012/01000/Fostering_and_Evaluating_Reflective_Capacity_in.15.aspx

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Assessing critical thinking

Quantitative Reasoning

• AAC&U VALUE Rubrics
• Quantitative Literacy

Quantitative literacy, also known as quantitative reasoning, is a “habit of mind”, competency, and comfort in working with numerical data. The ability to reason and solve quantitative problems from a wide array of authentic contexts and everyday life situations are the skills assessed. Students understand and can create arguments supported by quantitative evidence and can communicate such clearly and effectively.

• http://www.aacu.org/value/rubrics/quantitative-literacy
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Workplace Experiences/ Experiential Learning

• AAC&U VALUE Rubric: Integrative Learning
  http://www.aacu.org/value/rubrics/integrative-learning

• Internship Evaluation by Employer
  Creative Thinking & Problem Solving Skills
  • Breaks down complex tasks/problems into manageable pieces
  • Brainstorms/develops options and ideas
  • Demonstrates an analytical capacity

Internship, Clinical, and Field Experiences

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Assessing critical thinking

Creative Thinking

AAC&U VALUE Rubric: Creative Thinking

Competencies:
• Acquiring Competencies
• Taking Risks
• Solving Problems
• Embracing Contradictions
• Thinking Innovatively
• Connecting, Synthesizing, Transforming

Creative thinking in higher education can only be expressed productively within a particular domain. The student must have a strong foundation in the discipline.

http://www.aacu.org/value/rubrics/creative-thinking

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Ethical reasoning is reasoning about right and wrong human conduct.

**Ethical Reasoning Rubric (AAC&U)**
- Ethical Self-Awareness
- Understanding Different Ethical Perspectives and Concepts
- Ethical Issue Recognition
- Application of Ethical Perspectives and Concepts
- Evaluation of Different Ethical Perspectives and Concepts

Critical Thinking Outside the Classroom

• How do the experiences outside the classroom aid the student to develop the full spectrum of critical thinking skills?
Co-Curricular Experiences

Explicit or Implicit Teaching of Critical Thinking?
Learning Outcomes

Upon successful completion of (program, event, etc), the student will evidence critical thinking, through the articulation or demonstration of the sequential criteria listed below.

1. Identify a problem
2. Analyze the elements/facts of a specific situation/problem
3. Communicate the important elements/issues
4. Gather relevant situational information
5. Interpret information effectively relative to the problem
6. Establish relevant criteria and standards for acceptable solutions
Learning Outcomes

7. Develop alternatives to address criteria
8. Clarify assumptions
9. Predict implications and consequences
10. Construct well-reasoned solutions/conclusions
11. Support conclusions with fact
12. Communicate decisions (and throughout the process)
13. Use a process to make a decision
Example of Student Learning Outcome  
(Texas A & M University)

Process:
• Method for attainment of accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness in thought.

Consideration:
• There will be key communication points throughout a critical thinking process. Look for the ability to articulate logical and reasonable arguments, consider the ideas and perspectives of others, and synthesize multiple perspectives.
Evidence of Learning: Critical Thinking

• Leadership of a Process or Program requiring critical thinking skills.

• The student leader is asked to solve a situation within the student’s domain of responsibility.
  - Student self-reflects on the experience identifying his/her action related to the characteristics of critical thinking,
  - OR A student’s supervisor annotates evidence of critical thinking that the student applied to the problem as addressed in the student’s domain.

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Counseling and Critical Thinking


• Counselors with honed critical thinking skills will be the ones that become known for providing their clients with the best empirically-based interventions, rather than pop culture smoke and mirrors.

• How can you use the Paul-Elder model to interview student clients?
Your Turn!

- Co-Curricular
  - Define the critical thinking outcomes for a program or club.
  - Decide a process to demonstrate the outcome(s).
  - Articulate the assessment protocol.

- Curricular
  - Problem based learning example appropriate for your discipline.
  - Outline related assignment.
  - Define assessment.
Conclusion

• Questions?
• What was your most significant learning?
• What practice will you implement?

• Thank you for your attention and attendance.