Integrating Assessment & Faculty Development to Improve Course-Learning Outcomes Achievement Using the Critical Thinking Assessment Test (CAT)

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Why is Critical Thinking Important?

Information Overload
The Changing Nature of Education

Remembering Information

Finding Relevant Information

Understanding & Evaluating Information

Using Information Effectively
What is Critical Thinking?

Classical Emphasis
- Evaluate Arguments and Conclusions
  - Reasoning

Expanded Contemporary Emphasis
- Evaluate Ideas And Plans
- Problem Solving
- Communication
- Creativity
- Evaluate One’s Own Understanding
- Life-Long Learning Skills
## Skills Evaluated by CAT Instrument

### Evaluating Information
- Separate factual information from inferences.
- Interpret numerical relationships in graphs.
- Understand the limitations of correlational data.
- Evaluate evidence and identify inappropriate conclusions.

### Learning & Problem Solving
- Separate relevant from irrelevant information.
- Integrate information to solve problems.
- Learn & apply new information.
- Use mathematical skills to solve real-world problems.

### Creative Thinking
- Identify alternative interpretations for data or observations.
- Identify new information that might support or contradict a hypothesis.
- Explain how new information can change a problem.

### Communication
- Communicate ideas effectively.
CAT Features

- One hour exam
- Mostly short answer essay
- Faculty scored in workshops
- Detailed scoring guide
- Reliable
- Valid
A scientist working at a government agency believes that an ingredient commonly used in bread causes criminal behavior. To support the hypothesis the scientist notes the following evidence.

- 99.9% of the people who committed crimes consumed bread prior to committing crimes.
- Crimes rates are extremely low in areas where bread is not consumed.

Do the data described above strongly support the scientist’s hypothesis?  Yes____  No____

Are there other explanations from the data besides the scientist’s hypothesis? If so, describe.
___________________________________________________________________________________

What kind of additional information or evidence would help support the scientist’s hypothesis?
___________________________________________________________________________________
Teaching Critical Thinking

EFFECTIVE PRACTICES

- Real World Problems
- Service Learning
- Case Studies
- Simulation
- Debates
- Team Based Learning
- Original Research
Understanding the Disconnect

Teaching Critical Thinking

Assessing Factual Knowledge
Use the CAT to Assess Critical Thinking

ASSESSING & IMPROVING CRITICAL THINKING

Use the CAT as a Model for Better Course Assessments
Benefits of Course-Based CT Assessment

- How you learn determines how you will be able to use knowledge
- SOLVING REAL WORLD PROBLEMS
- Infusing critical thinking with discipline content prompts application
College-Wide Learning Outcomes

- Creative Inquiry
- Critical Thinking
- Civic Engagement
- Commitment to Well-Being
- Intercultural Competence

Wisdom to make a difference.
Selecting the CAT

- Faculty Development
- Reflection/Discussion
- Changes in Curriculum
Dissonance fosters critical thinking
The KSC CAT App Project

- Eight 100 level classes (four app & four non), 250 students
- Developed by an interdisciplinary team (Economics, Education, Math)
- Flexible design
CAT Applications (Apps)

• Designed to complement high impact educational practices.

• Encourage students to develop critical thinking skills while learning discipline content.
Critical Thinking Skill Set 1

How strongly does information support an idea.

Provide alternative interpretations for information or observations that have several possible interpretations.

Identify additional information or evidence needed to evaluate the alternative interpretations.

Patterns of Data  Historical Events  Literature
1. Some social scientists contend that raising average income levels within a country will result in longer lives for its citizens. How strongly does the data in the video support the idea that raising average income will increase life span?
2. Some economists disagree, contending that average income (e.g. GDP per capita) is not an effective predictor of life expectancy. Provide three reasons why some economists disagree that average income is a good predictor of life expectancy.
3. Some scholars would focus on the non-linear relationship the data exhibit over time and try to better understand factors that explain this observation. Others might question the value of a measure that emphasizes central tendency using “averages.” As you consider these issues, *What specific additional data would help to clarify these competing perspectives? Identify three measures that could be added to the conversation.*
Social Well-Being CAT App Scoring Rubric

• Anticipate Student Responses. (We found it helpful provide non graded “beta” versions of “apps” to collect potential student responses.)

• Provide examples of anticipated student responses.

• Create scoring rubric that reflects varying degrees of competency.
Critical Thinking Skill Set 2

Separate relevant from irrelevant information when searching for information to solve a real-world problem.

Identify and explain the best solution for a real-world problem using relevant information.

Explain how changes to a real-world problem situation might alter the recommended solution.

- Selecting New Lab Equipment
- Solving a Community Problem
- Designing a Set for a Play
Now what?
• College-Wide Learning Outcomes Committee

• Assessment of College-Wide Learning Outcomes

• Accreditation
Questions?