

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

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The Changing Nature of Education



**Remembering
Information**

Finding Relevant Information

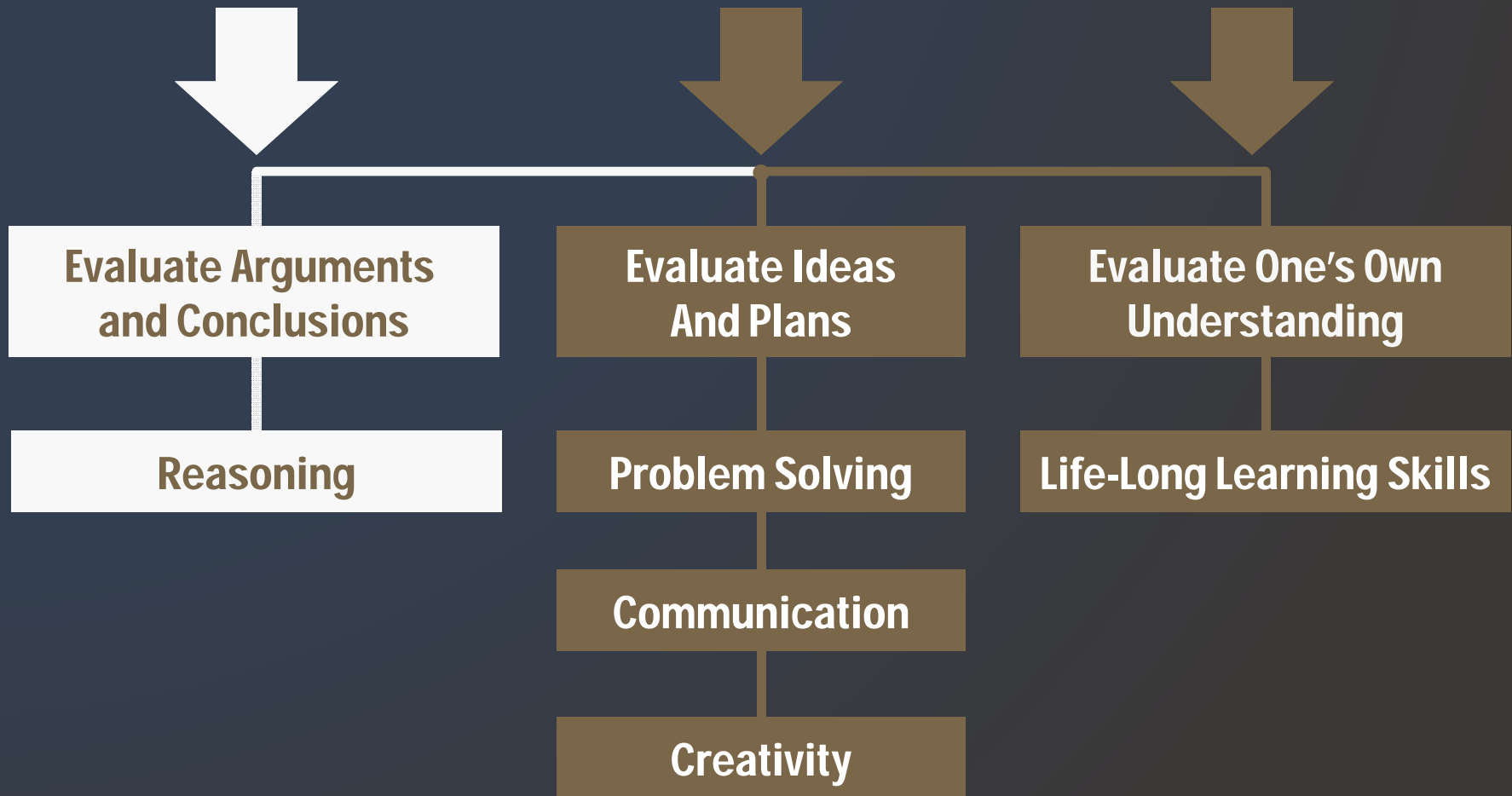
**Understanding & Evaluating
Information**

Using Information Effectively

What is Critical Thinking?

Classical Emphasis

Expanded Contemporary Emphasis



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.

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.

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.

Communication

- Communicate ideas effectively.

CAT Features

One hour exam

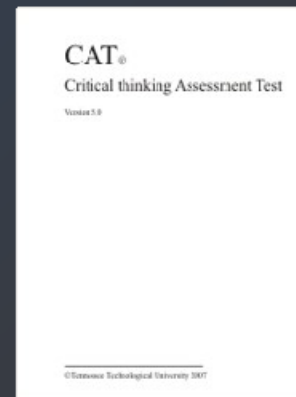
Mostly short answer essay

Faculty scored in workshops

Detailed scoring guide

Reliable

Valid



Test Booklet



Additional Information Packets

Sample Disclosed Question

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____

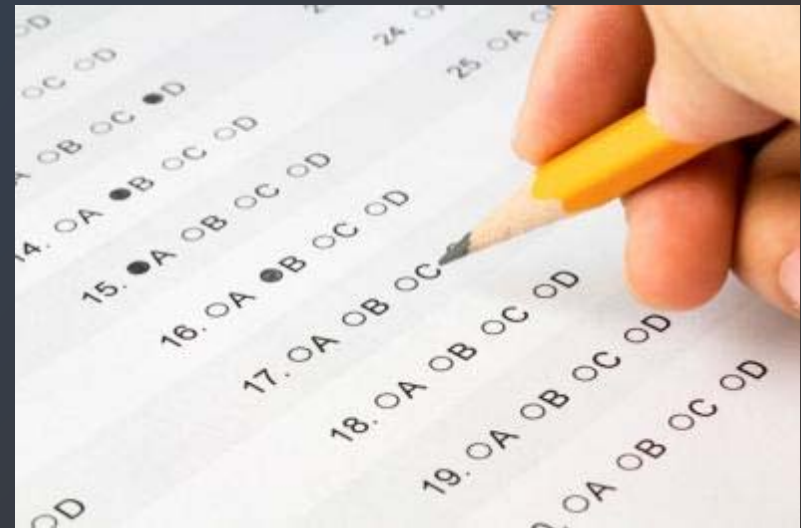
Are there other explanations from the data besides the scientist's hypothesis? If so, describe.

What kind of additional information or evidence would help support the scientist's hypothesis?

Teaching Critical Thinking



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**

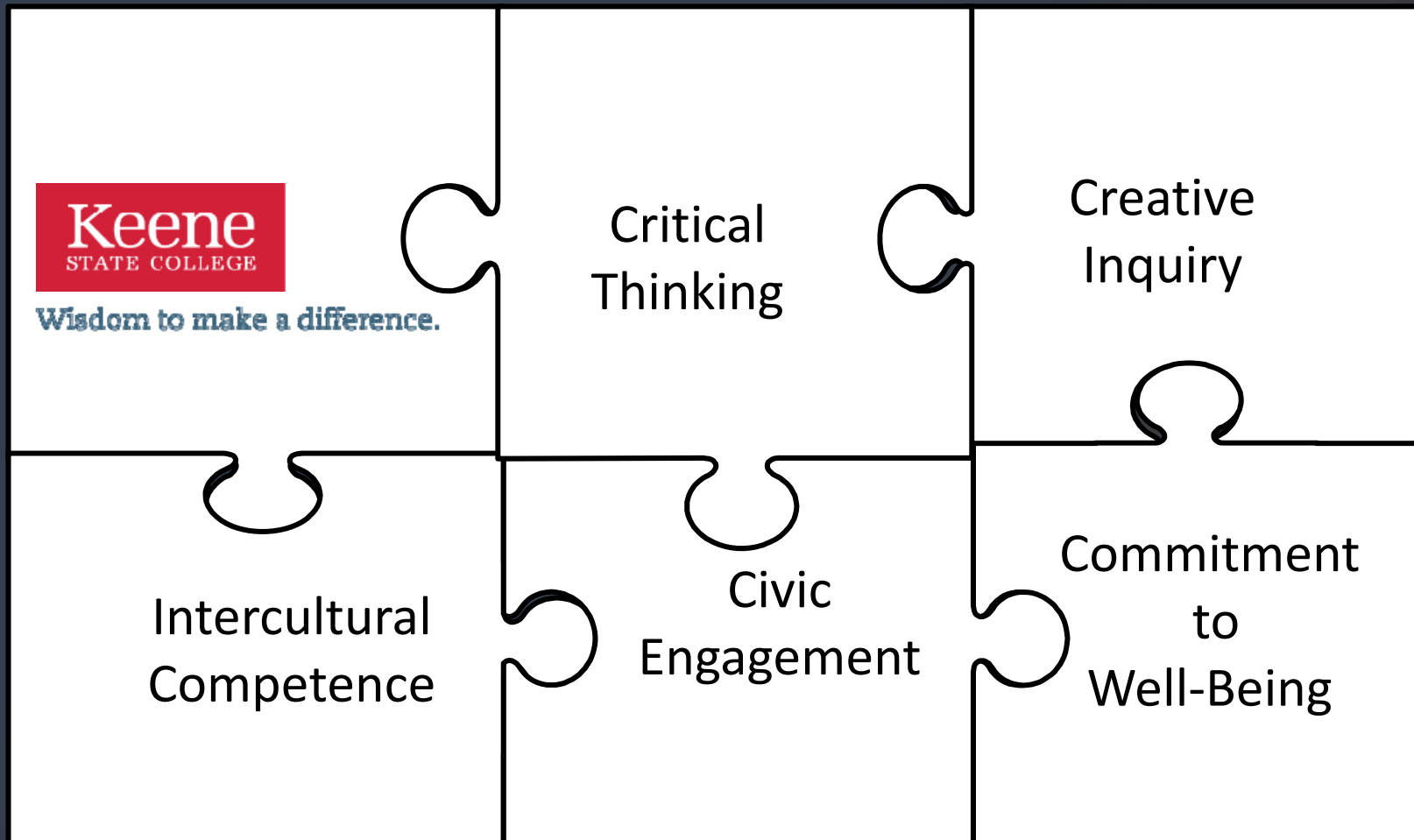
Benefits of Course-Based CT Assessment

**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



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

BBC FOUR



Social Well-Being CAT App Questions

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?

Social Well-Being CAT App Questions

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.

Social Well-Being CAT App Questions

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?

Thank You

www.CriticalThinkingTest.org



Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.