

Integrating Critical Thinking Activities to Enhance Student Learning Using the CAT Instrument

SACSCOC 2018 SUMMER INSTITUTE

PRESENTED BY:

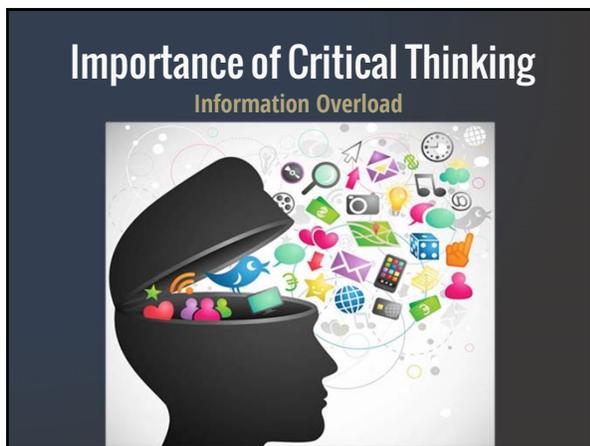
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Information and the Internet

97% of College Aged Adults Use the Internet to Search for Health Information

People are more likely to believe something on YouTube than from the CDC

Viral Nature of Misinformation

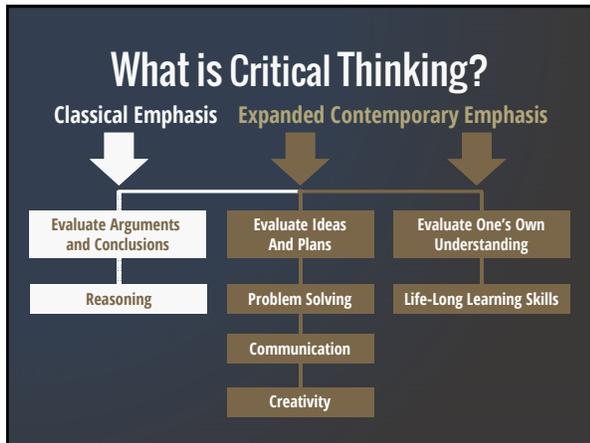
Search
≠
Research

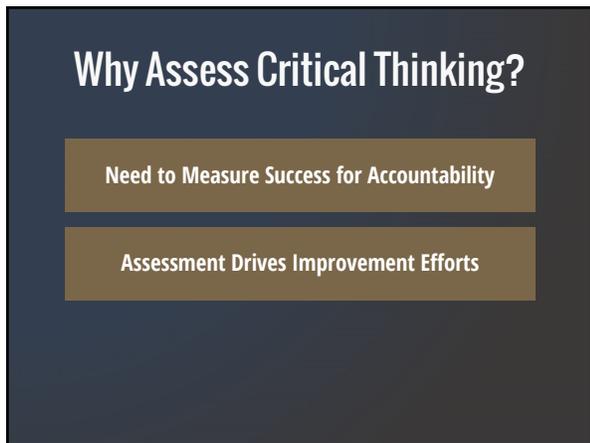


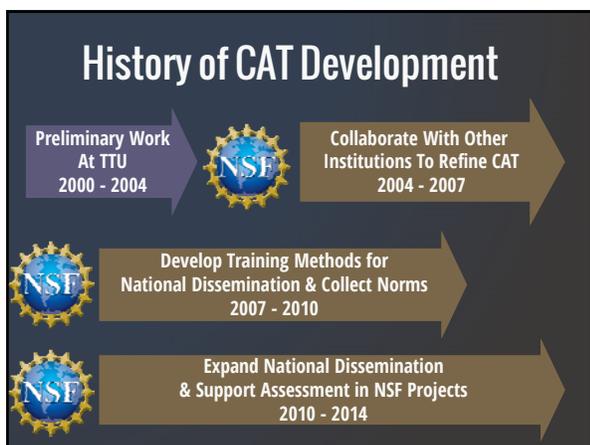
Confirmation
Bias

The Changing Nature of Education









Designing the CAT Instrument



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

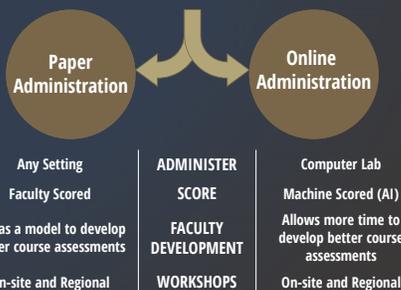
Identify alternative interpretations for data or observations.
Identify new information that might support or contradict a hypothesis.
Explain how new information can change a problem.

Communication

Communicate ideas effectively.

CAT Features

One hour exam; mostly short answer essay



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.

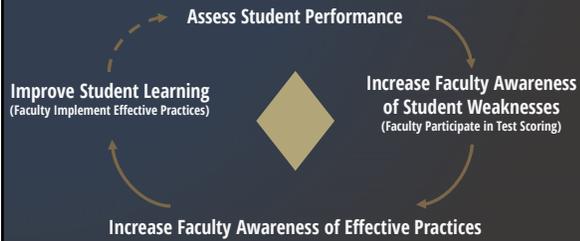
- 99.9% of the people who committed crimes consumed bread prior to committing crimes.
- Crimes rates are extremely low in areas where bread is not consumed.

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?

Closing the Loop in Assessment and Quality Improvement



**Critical Thinking @
Florida State University**

criticalthinking.fsu.edu

The CAT@ Florida State University

Primary Assessment Tool

Professional Development
Opportunity

Faculty Training

Numbers @ Florida State University

16 of 17
Colleges

Branch Campuses

31 Unique Majors

"Outside" Projects

5,500+ CAT Instruments Administered

Campus Impacts @ Florida State University

Discipline –
Specific Critical
Thinking
Rubrics

Changes in
Pedagogy

"by introducing that kind of real-life problem based learning, they (students) are able to identify the problem needs in their own way... instead of having the same information on the problem, they are given the opportunity to uncover their own information on the problem."

Campus Impacts @ Florida State University

Discipline –
Specific Critical
Thinking
Rubrics

Changes in
Pedagogy

Reframing Test
Questions

“If you are not testing them on critical thinking, they may still be able to figure out those definitions, but not necessarily understand the deeper meaning.”

Campus Impacts @ Florida State University

Discipline –
Specific Critical
Thinking
Rubrics

Changes in
Pedagogy

Reframing Test
Questions

Discipline – Specific
Critical Thinking Assessments

Why Assess Critical Thinking?

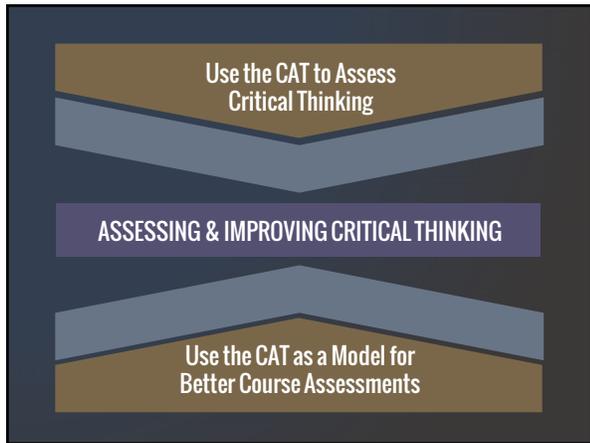
Need to Measure Success for Accountability

Assessment Drives Improvement Efforts

How We Assess - Determines What Students Learn

Benefits of Course-Based CT Assessment





Critical Thinking Skill Set 1





CAT App: Interdisciplinary

Courtney Cox believes that drinking alcohol keeps women skinny. She supports this argument with the following evidence.

- In a medical study, doctors found that women who drank moderate amounts of alcohol were less likely to be overweight or obese in the future.

Strength of Support

Courtney Cox believes that drinking alcohol keeps women skinny. She supports this argument with the following evidence.

- In a medical study, doctors found that women who drank moderate amounts of alcohol were less likely to be overweight or obese in the future.

The evidence from the medical study *strongly supports* Courtney's argument. YES or NO

OR

How strongly does the evidence from the medical study support Courtney's argument?

Alternative Interpretations

Courtney Cox believes that drinking alcohol keeps women skinny. She supports this argument with the following evidence.

- In a medical study, doctors found that women who drank moderate amounts of alcohol were less likely to be overweight or obese in the future.

What are other interpretations for the results of the medical study aside from Courtney's interpretation?

Additional Information

Courtney Cox believes that drinking alcohol keeps women skinny. She supports this argument with the following evidence.

- In a medical study, doctors found that women who drank moderate amounts of alcohol were less likely to be overweight or obese in the future.

What additional information would we need to more fully evaluate the situation?

Using Headlines to Develop CAT Apps

Is Comfort Food Causing Your Depression?

EVIDENCE: "A recently published study in the Journal of Public Health Nutrition showed that people who ate hot dogs, hamburgers, and pizza were 51% more likely to suffer from depression than those who rarely or never ate the stuff."

CONCLUSION: Eating fast food causes depression.

<http://psychcentral.com/blog/archives/2012/05/15/is-comfort-food-causing-your-depression/>

Is Comfort Food Causing Your Depression?

3a. Are there other interpretations for the finding of the study other than Natasha's interpretation? If so, try to provide three alternative interpretations for the finding.

4a. What additional information would help Natasha better understand the connection between fast food and depression? Identify three pieces of additional information.

CAT App: History

Abraham Lincoln is commonly known by many Americans as the 'Great Emancipator'. This nickname derives from Lincoln's signing of the Emancipation Proclamation. The text of this document declared on September 22, 1862 that slaves were "forever free." In signing this document, Abraham Lincoln single-handedly freed all slaves.

1. How strongly does the text of the Emancipation Proclamation support the conclusions that all slaves were freed?
2. Are there alternative interpretations for the intent of the Emancipation Proclamation? Provide an alternative interpretation.
3. Identify 3 types of additional information that would help you investigate the intent of the Emancipation Proclamation and explain why each source would be helpful.

CAT App: Chemistry

Michelle recently moved to Milwaukee, WI from Tallahassee, FL. Before moving, she bought a brand new Toyota Camry. On her way to work, Michelle noticed her tire pressure sensor light had come on. Michelle mentioned her tire problem to her co-worker Joe, who suggested that Michelle probably has a tire puncture. Joe recommends that Michelle get her tires patched as soon as possible to address the issue.

1. How strongly does the information provided support Joe's idea that Michelle's tires have leaks due to punctures?
2. List two alternative explanations.
3. What additional information is needed to evaluate these explanations?

M. Edington, Florida A&M University

CAT App: Ecology

Before 1934 in Panama City, the East Pass (now referred to as the Old Pass) was the only way to get from Saint Andrews Bay into the Gulf of Mexico. When the U.S. Army Corps of Engineers dredged the pass in 1934 at what is now St. Andrews State Park, the substantial changes in tidal flow patterns filled the East Pass with sand. Since the closure of East Pass, seagrass beds have declined, shrimping has waned, and bay scallops have completely disappeared.

Bay County commissioner Bill Dozier has been talking about reopening the East Pass since 2008, but no one's in Tallahassee or Washington has been listening. "Opening the old pass is certainly a win win for the environment. It's a win for the locally community and the bay system as a whole. It will allow that fresh sea water in and help the bay all the way around," said Dozier in 2012.*

1. How strongly does the information provided support Dozier's assertion that reopening the Old Pass will improve the ecology of the bay?

(*Taken from http://www.wjhg.com/home/headlines/Bay_County_Revisting_Old_Pass_Issue_158484075.html)

CAT App: Ecology Grading Rubric

0 pts.	Definitely Supports <i>The decline in shrimping, scallops, and seagrass since it closed indicates that the opening of Old Pass is necessary to improve the bay habitat.</i>
2 pts.	Supports with a qualifier <i>It appears that closing the pass negatively impacted the bay, and reopening it might improve conditions.</i>
3 pts.	Supports with a qualifier AND suggests alternative explanations <i>While reopening the pass may benefit the bay habitats, there are other possible reasons for the decline. (E.g., increased population since 1934 causing more pollution, increased boating activity damaging seagrass beds, changes in stormwater runoff due to development, impacts of damming freshwater tributaries, etc.)</i>

What the Noles are saying

Questioning Experts

Dr. Raymond [has] a very big emphasis on it [critical thinking]. And that has definitely led to...going out of my comfort zone if I need anything and being able to assess what you have in front of you. Asking questions even if you do not feel comfortable about it. And normally I won't go to the teacher and be like. I don't think this [textbook] is right, I think this is completely wrong.

Different Approaches to Gathering Information

...I specifically went to the Veterans Film Festival because I wanted to do more research on this [design] project and see what their lives are [like on a] daily basis ... a high sense of awareness, just [about] everything is a threat to some veterans.

Lessons Learned @ Florida State University

- Be the Partner/Facilitator Not the Expert
- Look for Early Adopters
- Campus Partnerships Go Along Way
- Encourage/Support Faculty Publications and Presentation
- Look at it as Herding Cats – Not Cattle
- Keep the Lines of Communication Open with the CAT Folks

Creating a Community



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.
