


# Assessing Critical Thinking Skills

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Partial support for some of this work reported was provided by the National Science Foundation's CCLI Program under grants 040911, 0717654  
2008 SACS/COC Summer Institute on Quality Enhancement and Accreditation

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## Workshop Schedule

- Overview & Presentation
- Developing Evaluation Plans
- Additional Q & A

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## Importance of Critical Thinking

National polls indicate over 90% of the faculty in this country think critical thinking is the most important part of undergraduate education.

Derek Bok, 2005  
President Emeritus of Harvard University



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### Why Assess Critical Thinking?

Need to Measure Success for Accountability

Assessment Drives Improvement Efforts

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### Obstacles to Assessment

Agreement on What Should be Measured

Valid & Reliable Tools for Assessment

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### What is Critical Thinking?

Classic Emphasis

Evaluate Arguments and Conclusions

Reasoning

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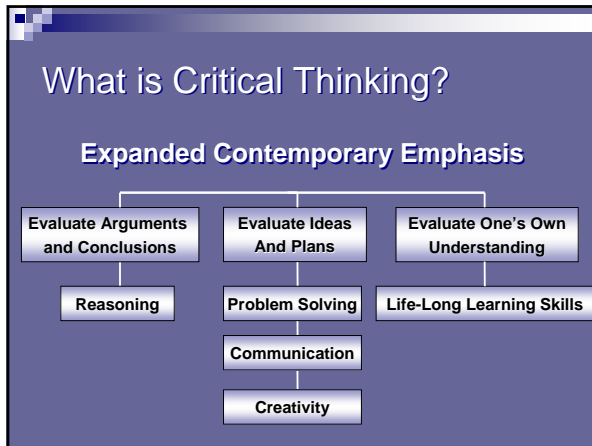
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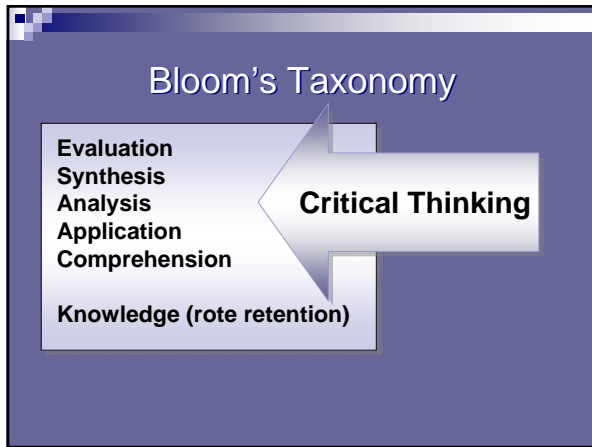
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## Agreement on what is not Critical Thinking

**\*NSSE Question**

**(2a) Memorizing facts, ideas, or methods from your courses and readings so you can repeat them in pretty much the same form.**

\*National Survey of Student Engagement , Indiana University

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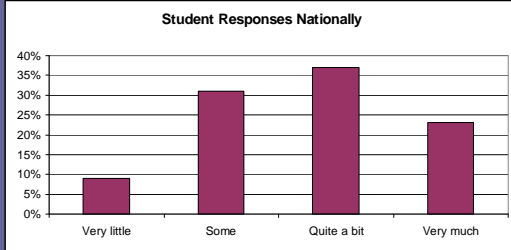
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**NSSE: Coursework emphasizes:**  
Memorizing facts, ideas, or methods from  
your courses and readings



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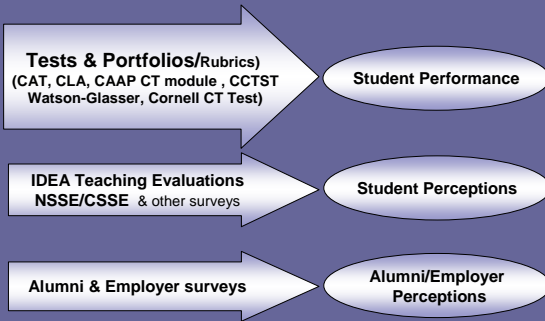
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### Various CT Assessments



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### Characteristics of Effective Performance Assessment

High Face Validity = Faculty Acceptance

Criterion Validity = Actually Measuring CT

Sensitive to Treatments = Useful for QEP

Faculty Involvement in Scoring = Faculty  
Motivation to Change

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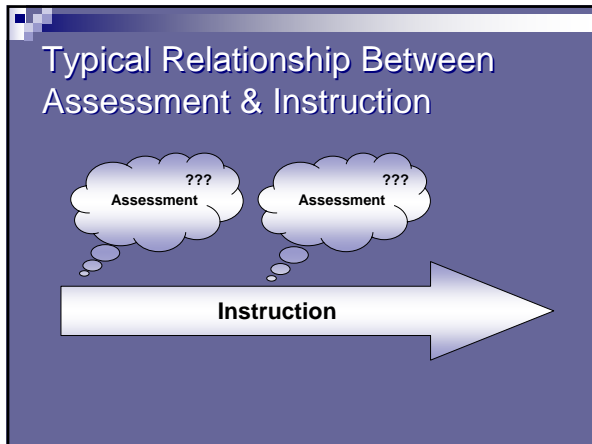
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- ### Benefits of a Faculty Scored Test
- Faculty development opportunity
  - Educate faculty about student weaknesses
  - Create forum for discussing best practices
  - Link assessment to improvement initiatives

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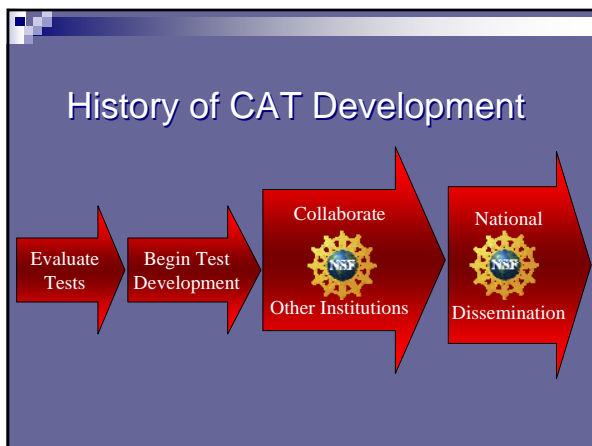
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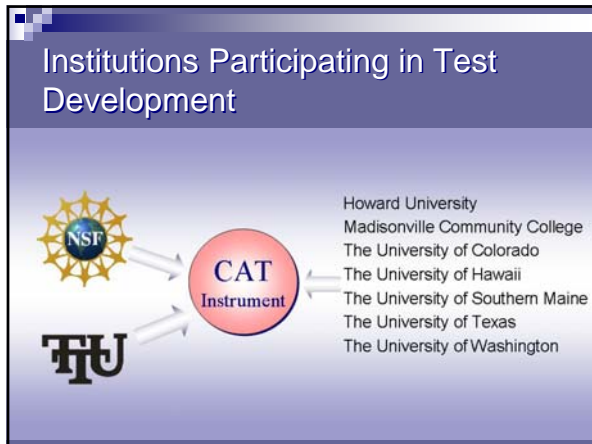
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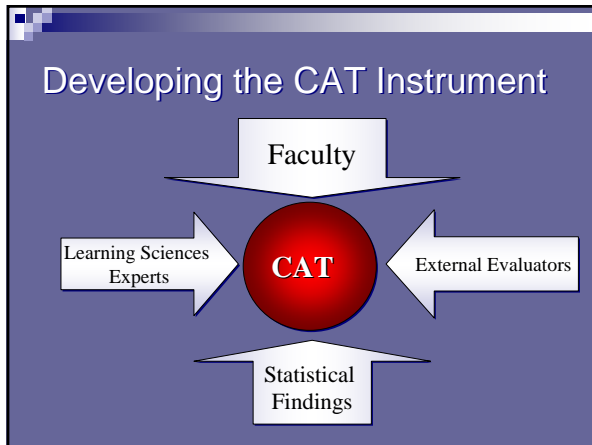
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### Skills Evaluated by CAT Instrument

**Evaluating Information**

- Separate factual information from inferences.
- Interpret numerical relationships in graphs.
- Understand the limitations of correlational data.
- Identify inappropriate conclusions.

**Evaluating Ideas/Other Points of View**

- Identify & evaluate evidence for a theory.
- 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.

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## CAT Features

- One hour exam
- Mostly short answer essay
- Faculty scored in workshops
- Detailed scoring guide
- Reliable
- Valid




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## CAT Features

A scientist working at a government agency believes that an ingredient commonly used in bread causes criminal behavior. To support the theory the scientist notes the following evidence.

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

Do the data presented by the scientist strongly support the theory? Yes \_\_\_ No \_\_\_

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

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

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## CAT vs. CCTST with NSSE

NSSE Question	CAT Coefficient	CCTST Coefficient
(2a) Memorizing facts, ideas, or methods from your courses and readings so you can repeat them in pretty much the same form. <i>(negative relationship)</i>	-.341 *	-.212 *
(3b) Number of books read on your own (not assigned) for personal enjoyment or academic enrichment.	.277 *	-.124
(11e) Thinking critically and analytically & (11m) Solving complex real-world problems	.244 *	.144
(7h) Culminating Senior Experience (thesis, capstone course, project, comprehensive exam, etc.)	.231 *	.025

\* Significant at .01 level

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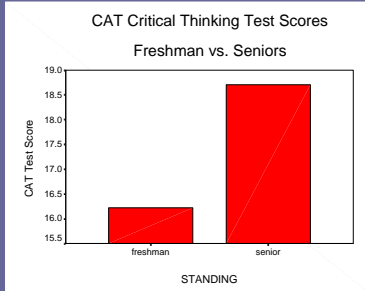
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## CAT Instrument Sensitive to Class Standing



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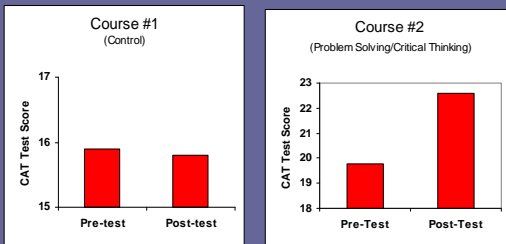
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## Sensitive to Effects of a Course



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## Ensuring Reliability of Scoring



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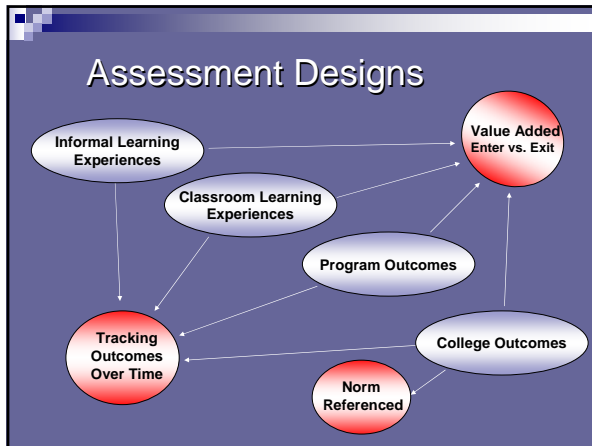
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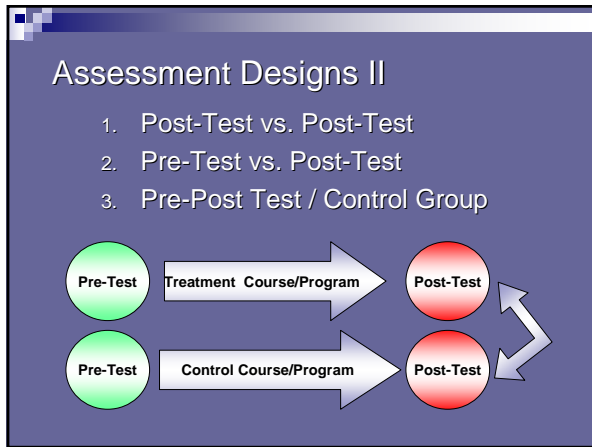
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### Designing an Assessment Plan Using the CAT Instrument

	Model Design	Population	Sampling Procedure	Desired Finding	Issues	# Tests Needed
More Expensive	Pre-test vs. Post-test with Control Group (in course or program)	Course Program		Students show more improvement from the pre-test to the post-test than the control group.	expense	
	Pre-test vs. Post-test (in course or program)	Course Program		Students show improvement from the pre-test to the post-test.		
	Freshmen vs. Upperclassmen (value added) Track same students over time	Freshmen & Upperclassmen		Students show significant gains from freshman year to senior year.	Attrition, expense, time	
Less Expensive	Freshmen vs. Upperclassmen (value added) Cross-sectional study (must equate groups)	Freshmen & Upperclassmen		Senior level students perform better than freshmen.	Must control for ability	
	Track Institutional Progress over time	Upperclassmen		Institution scores improve over time.		
	Track Institutional Progress over time with National Norm Comparison	Upperclassmen		Institution scores improve over time and/or surpass national scores.		

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### Other Tools for Assessing Critical Thinking

- Enrolled Student Surveys (NSSE/CSSE)
- Student Evaluations of Teaching (IDEA)
- Alumni Surveys
- Employer Surveys

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### Enrolled Student Surveys (NSSE/CSSE)

Course Work Emphasis
<b>Memorizing</b> facts, ideas to repeat in rote form
<b>Analyzing</b> ideas, experiences, or theories

Institutional Contribution to Skills
Institution contributed to skills in thinking critically and analytically
Institution contributed to skills in solving complex real-world problems
Institution contributed to skills in learning effectively on your own

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### Course Teaching Evaluations (IDEA)

Learning to apply course material (to improve thinking, problem solving, and decisions)
Acquiring skills in working with others as a member of a team
Developing creative capacities
Developing skill in expressing myself orally or in writing
Learning how to find and use resources for answering questions or solving problems
Learning to analyze and critically evaluate ideas, arguments, and points of view

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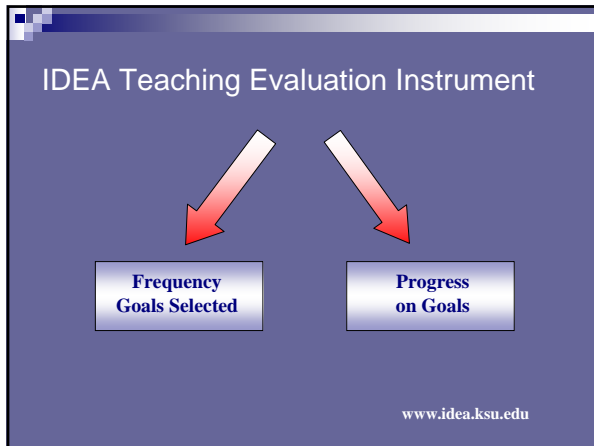
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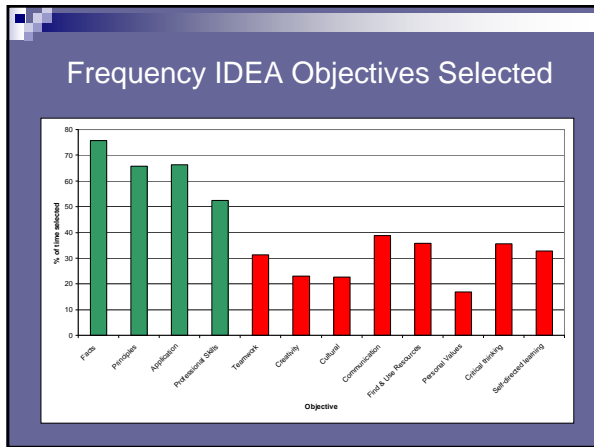
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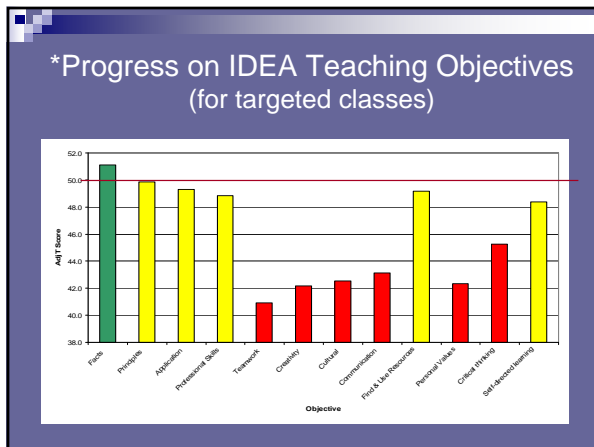
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## Alumni Surveys

### Example topics from TTU survey

- Self-confidence in expressing ideas
- Planning and carrying out projects
- Speaking effectively
- Writing effectively
- Learning on your own
- Defining and solving problems
- Working cooperatively in a group

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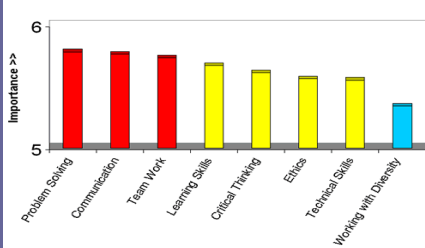
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## Employer Surveys

### What Employers Consider Important



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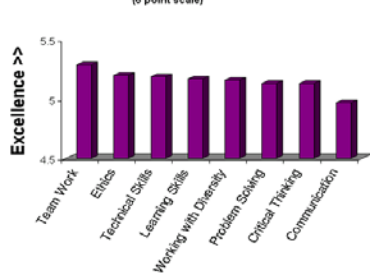
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## Employer Surveys

### How Employers Rate TTU Graduates



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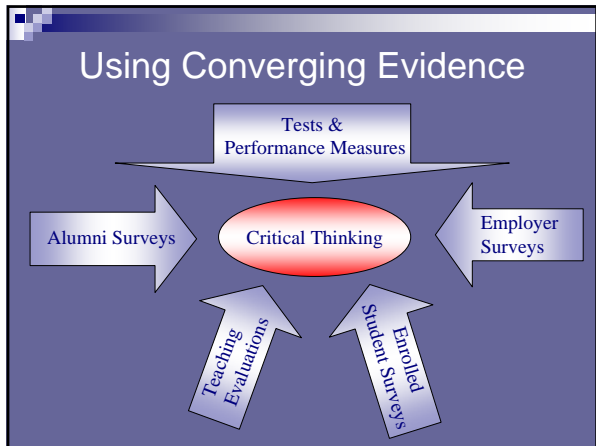
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## Thank You

**Center for Assessment and Improvement of Learning**  
[www.CriticalThinkingTest.org](http://www.CriticalThinkingTest.org)

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