Critical Thinking Outcomes Assessment
Truth–Talking & Practical Strategies

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Measuring Critical Thinking Worldwide
Publishers of the California Critical Thinking Tests & other measures of reasoning and problem solving:

- California Critical Thinking Skills Test (CCTST)
- Test of Everyday Reasoning (TER)
- California Critical Thinking Disposition Inventory (CCTDI)
- Health Sciences Reasoning Test (HSRT – Parts 1&2)
- California Measure of Mental Motivation (CM3)
- Business Critical Thinking Skills Test (BCTST)
- Business Reasoning Test (BRT)
- Business Attitude Inventory (BAI)
- Legal Studies Reasoning Profile (LSRP - Parts 1 & 2)
- Military and Defense Critical Thinking Inventory (MDCTI -Parts 1&2)
- Quant Q (Test of Mathematical Reasoning)
Why Assess Critical Thinking?

Critical thinking is more important for human survival than reading, writing or mathematics.

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If the failed learning outcome is critical thinking

- patient deaths
- lost revenue
- ineffective law enforcement
- divorce
- job loss
- imprisonment
- combat casualties
- upside down mortgages
- vehicular homicide
- unplanned pregnancies
- financial mismanagement
- heart disease
- family violence
- repeated suicide attempts
- drug addiction
- ...
My favorite definition of critical thinking:

Critical thinking is the process for determining what to believe and what to do.
When do humans use critical thinking?

When we don’t already think we know what to believe or what to do.

In most other situations we rely on protocols and the application of well integrated responses (automaticity) that are the result of successful past problem solving.
Why do humans use a critical thinking process?

to arrive at an accurate and comprehensive analysis of the problem and /or an optimal judgment about what to believe and what to do (or not do) when the stakes are high.
There is nothing linear about critical thinking.

The assessment of critical thinking should not be linear. This has implications for the development of rubrics.
Real Life Situations & Problems

Publisher: Pearson Education
Three Basic Options for Measuring Learning Outcomes

1. Rubrics and Rating Tools
   Qualitative Rating Forms, Typological Matches, Checklists
   **Require practiced judgment and inter-rater calibration**
   Adaptable to performance and written data

2. Self Reports
   Journals, Self Critiques, Focus Groups, Questionnaires
   Insights about personal progress and deficiency
   Require significant resources for data analysis

3. Testing Instruments
   Tests / Attitudinal Surveys /Norm-referenced
   Time thrifty/Validated/Longitudinal/Snapshot
   Potential for comparisons & data integration

Are we consistently getting a trustworthy measure of the phenomenon we intended to target?
Teaching and Assessment Tool Scoring Rubrics

Describe three or four levels of performance

- **Excellent/Strong** = 4
- **Adequate/Satisfactory** = 3
- **Deficient/Weak** = 2
- ** Truly Dreadful** = 1

[Holistic Critical Thinking Scoring Rubric (HCTSR)](www.InsightAssessment.com)

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4= Strong

Consistently does all or almost all of the following:

Accurately interprets evidence, statements, graphics, questions, etc.
Identifies the salient arguments (reasons and claims) pro and con.
Thoughtfully analyzes and evaluates major alternative points of view.
Draws warranted, judicious, non-fallacious conclusions.
Justifies key results and procedures, explains assumptions and reasons.
Fair-mindedly follows where evidence and reasons lead.

HCTSR: Download free at:
www.InsightAssessment.com
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‘Authentic’ Assessment

Task based assessment scored by a rubric

Demonstration of the integration of knowledge and skills, certainly necessary in practice based disciplines

AAC&U Summer Institute: Engaging Departments
The 2010 Institute will concentrate on:

- assessments for achieving and improving essential learning outcomes, **concentrating on authentic assessments based on the work faculty are already doing in the classroom**

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“Authentic assessment” is one of the word phrases George Carlin warned us about

- This type of assessment should be called “task based assessment scored by a rubric”
- It is not fairminded to use a term that suggests that all other forms of assessment are inauthentic or invalid.
- There are a number of ways to validly measure critical thinking.
- Each requires that the measurement tool demonstrates quality and produces a valid and reliable result.
Using rubrics to assess critical thinking

- Task based assessment can be used to assess critical thinking.
- There is much time and effort involved, but this is done every day in practice disciplines.
- The metric (rubric, protocol) used in this assessment must be valid.
- Reliability of the assessment rests on the training of the raters.
- The statistic to demonstrate that the ratings are being done reliably is call the Kappa statistic.
- This is not the only legitimate way to assess critical thinking.
The career outcome is known and the stakes are usually regarded as high.

Task based assessment: Internships Preceptorships Laboratories

Summative assessment is usually done with a norm referenced test that can predict successful licensure or certification.

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Valid & Reliable Measures of Critical Thinking
‘Norm referenced’ tests


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Validated by a 30 years of research on item performance and by independent peer reviewed research …….
A selection of independent peer reviewed research on critical thinking skills that have used these instruments:

Barak et al. 2006  Scientific reasoning  *Research Science Educ*
McCall et al. 2007  NAPLEX Performance  *Amer J Pharmacy Educ*
Albert et al. 2002  Bilingualism  *J Professional Nursing*
Tiwari et al. 2006  Problem–based learning  *Medical Education*
Denial. 2008  Clinical performance  *J Optometry Education*
Kennison. 2006  Reflective writing  *Education Perspectives*
Colt. 2007  NATABOC certification for athletic training  Dissertation
Vendrely. 2007  Physical therapy licensure  *J Allied Health*
Giddens et al. 2005  NCLEX–RN pass rate  *J Nursing Education*
McBride et al. 2002  Preservice teachers’ prep  *Teachers & Teaching*
Evans et al. 2004  Cognitive and ethical maturity  *Educ Perspectives*
Use science and get the most value from your data

180 MBA Students
BCTST Scores

Total score on Critical Thinking Skills

Weak scores identify students who are not likely to be ready to benefit from your curriculum.

Business Critical Thinking Skills Test Scores

Name _School of Commerce – MBA students Date __May 2009____

Skills Measure ____Business Critical Thinking Skills Test____

A life long rewards for continued improvement – Personal QEP

Willing and able to think well

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Critical Thinking Dispositions

This instrument is the CCTDI
California Critical Thinking Dispositions Inventory
Available in 20 culturally competent translations

American Philosophical Association Delphi Report:
Consensus Definition of Critical Thinking (1990)
Download: CT Resources Link  www.insightassessment.com
Truthseeking

- Striving for best knowledge and following reasons and evidence wherever they lead:

Apollo 13: “Houston, we’ve got a problem”
Group data on the CCTDI

- Truthseeking
- Openmindedness
- Analyticity
- Systematicity
- Confidence
- Inquisitiveness
- Maturity

Mean
Highest
Lowest
Gains: Critical Thinking Disposition

Pre-Test Post-Test Comparison
Mean scores and ranges for each scale
XYZ College Graduating Seniors

CCTDI Profile

Statistically significant gains on truth-seeking, systematics and maturity of judgment

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Implications for group instruction

![Critical Thinking Scores Matrix – Scatter Plot]

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Thoughts on the pretest post test method to demonstrate gains on desired outcomes

Use the right tool:
* Correct calibration and clear interpretation

The instrument must be calibrated to provide you with an array of scores that:

1) Differentiates well between your strong, satisfactory and week performers in critical thinking skills.

2) A comparison with a norm sample (individual and group).

3) Provide you with areas of strengths and weaknesses to guide curriculum development.

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Thoughts on the pretest post test method to demonstrate gains on desired outcomes

Use local talent and good data

Data analysts and true measures

Consult those who can help you to examine the data optimally. Use only data that is representative of your test taker group.

A consultation on best practice for data cleaning is available to clients upon request from the staff at Insight Assessment.

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For instance: If the 2008 data represents a small group tested under suboptimal conditions, these data are not helpful for trend analysis, and require no further explanation.
Thoughts on the pretest post test method to demonstrate gains on desired outcomes

Attention to design is needed

Student motivation and timing

Design a plan that uses optimal timing to collect diagnostic, formative and summative data on your test takers.

Consider providing students their results as motivation for effort.

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What do you and your stakeholders want to know?

Thank you: Insight Assessment
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