## Introduction

Selecting a standardized test for use in assessment should involve a great deal of forethought, investigation, and analysis. Simply scanning a technical manual for evidence of reliability and validity is not enough. Evidence contradicting author claims is often well documented in the literature, as is the case with the most popular critical thinking assessments (Ku, 2009).

A thorough evaluation can ensure construct and content validity, reliability of the scale with the institution-specific population, applicability, utility, interpretability, and, most importantly, fidelity. Please note this presentation is specifically oriented to multiple-choice assessment instruments.

### Test Evaluation Procedures

#### ASSESSMENT SELECTION

1. **Mapping & Utility**
   - a) Check the alignment of the test components against the intended student learning outcomes. Is there adequate coverage and alignment?
   - b) Understand how data will be reported, i.e. aggregated or disaggregated, norm-referenced, etc. Will the data be useful and interpretable?

2. **Conduct a Literature Review**
   - a) Review studies that report data related to the assessment.
   - b) Identify contradictions in the results and gaps in the literature. Is there a concern about why this data is not available or contradictory?

3. **Content Validity & Expert Review**
   - a) Preview assessments with expert faculty members.
   - b) Take the perspective of the student or have students preview the test, as well.
   - i. Ensure test measures what you intend it to measure.

4. **Pilot with the Population**
   - i. Examine the “fairness” of items.
   - ii. Examine reliability of the scale and sub-scales.
   - iii. Test the factor structure.
   - iv. Ensure criterion validity.

5. **Experimental Design**
   - i. Pre-test v. Post-test
   - ii. Control Group

### Examples of Statistical Tests

- **Fairness – Differential Item Functioning**
- **Reliability – Alpha or KR-20**
- **Factor Structure – Confirmatory Factor Analysis**
- **Criterion Validity – Predictive & Concurrent using SAT/ACT and GPA.**

### Literature Cited


## USFSM Incred-i-Bull Critical Thinking Student Learning Outcomes

1) Students will formulate vital questions and problems clearly.
2) Students will gather and assess relevant information.
3) Students will identify assumptions, alternatives, and implications.
4) Students will come to well reasoned conclusions and solutions.
5) Students will communicate reasoning effectively.

## Example Results - California Critical Thinking Skills Test

Instability of the psychometrics of the CCTST was found within the literature. The CCTST would benefit from more detailed and thorough psychometric analyses. To strengthen the validity of the instrument a peer-reviewed study involving a national random sample of the target group, college students, should be performed. The wide-casted random sample can ensure generalizations to the wider population.

Researchers should perform confirmatory factor analyses to ensure the internal validity of the sub-scales and review measurement invariance, results from both are lacking in the literature. Additionally, the conflicting results of the pre and post-test scoring requires more testing in this area, as well.

### Reliability of Test – KR-20

- **Reliability of Test – KR-20**
  - 68 to .69 (Facione, 1990a)
  - 72 (InsightAssessment, 2013)
  - 78 (Angeli & Valanides, 2009)

### Reliability of Subscales

- **Reliability of Subscales**
  - Analysis = .21
  - Evaluation = .50
  - Inference = .38
  - Inductive Reasoning = .51
  - Deductive Reasoning = .46 (Leppa, 1997)

### Test Results

#### Long Term Results

- **GRE Total Score** .719 p<.001
- **GRE Analytic** .708 p<.001
- **GRE Verbal** .716 p<.001
- **GRE Quantitative** .682 p<.001

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