General Education - Critical Thinking and Assessment - Oct. 10, 2014

LAURA BLASI & KAREN BORGLUM
CURRICULUM AND ASSESSMENT
The Goal of the workshop

- Have a shared understanding of the Critical Thinking work at Valencia.
- Simplify the assessment of Critical Thinking in the General Education Program.
Agenda

1. History of the Critical Thinking Outcome at Valencia
2. Results from the 2014-2015 Assessment
4. Reflection and Application Activities
5. Next Steps – The Assessment Activities for Fall 2014
Part I – History of the Critical Thinking Outcome
Critical Thinking

Critical Thinking is applying systematic thinking based on evidence across disciplines, for example, from poetry to chemistry. We think critically by evaluating assumptions in light of data, trying to create explanations, and considering appropriate action steps (Brookfield, 1987). The ability to think critically, in relation to problem solving, is high among employer expectations.

Richard Paul's (1995) comprehensive model lists seven key components of critical thinking:

- Purpose
- Key Questions
- Data
- Concepts
- Implications
- Assumptions
- Point of View
Year of Think

The Year of THINK was held in 2005-06 focused on assessing the THINK Competency. The objective of the project was to investigate an assessment process for Valencia's core competency of THINK grounded in the evaluation of actual student work. This was assessed as part of Think, Value, Communicate, and Act (TVCA.)
# Rubric for the Analytical of Critical Thinking across the Curriculum

## Year of Think-Rubric

<table>
<thead>
<tr>
<th>THINK Indicators</th>
<th>Levels of Achievement</th>
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<tbody>
<tr>
<td></td>
<td>Beginning</td>
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<tr>
<td>Analyzing info:</td>
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<tr>
<td>data, ideas,</td>
<td>Inaccurate</td>
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<tr>
<td>or concepts</td>
<td>Copies information</td>
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<td>often inaccurately,</td>
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<td>incompletely, or</td>
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<td>omits relevant</td>
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<td>information</td>
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<td>solv. sol. or</td>
<td>Singular</td>
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<td>pers</td>
<td>Names a single solution,</td>
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<td>or pers</td>
<td>position, or</td>
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<td>perspective, often</td>
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<td>inaccurately, or</td>
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<td></td>
<td>fails to present</td>
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<td>a solution, position,</td>
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<td></td>
<td>or perspective</td>
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<tr>
<td>Subject</td>
<td>Illogical</td>
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<tr>
<td>Know: depth of</td>
<td>Attempts a conclusion</td>
</tr>
<tr>
<td>content:</td>
<td>or solution inconsistent with evidence presented,</td>
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<tr>
<td>rel. sup:</td>
<td>that is inconsistent</td>
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<tr>
<td>clear expl.</td>
<td>that is illogical, or</td>
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<tr>
<td></td>
<td>omits a conclusion</td>
</tr>
<tr>
<td></td>
<td>or solution altogether</td>
</tr>
</tbody>
</table>

**Use of Evidence**

**Bias**

**Context**
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- Purpose
- Key Questions
- Data
- Concepts
- Implications
- Assumptions
- Point of View

Use of Evidence

Bias

Context
## Gen Ed Checklist: Critical Thinking - 2014

<table>
<thead>
<tr>
<th>Overall, this student:</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
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<tbody>
<tr>
<td>A1 Critical Thinking – Influence of Context</td>
<td></td>
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<tr>
<td>Examines the relevance of appropriate contexts when presenting ideas.</td>
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<tr>
<td>A2 Critical Thinking – Bias</td>
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<tr>
<td>Effectively analyzes own and others’ assumptions</td>
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<td>A3 Critical Thinking – Use of Evidence</td>
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<td>Demonstrates a comprehensive synthesis or analysis of issues, ideas, artifacts, or events.</td>
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Faculty work leading to Fall 2014

Faculty members in the Humanities, Comp I & II, and the Social Sciences met on the afternoon of Assessment Day and identified the need for an online training for use of the Checklist (LOBP 3333).

Science faculty members have been developing and administering multiple choice questions over the past several years and raised the need for more reliable and valid questions.

All of the Gen Ed disciplines are looking to assess Critical Thinking in meaningful ways.
House Bill 7135

House Bill 7135 **Florida Statute 1007.25** General education courses; common prerequisites; other degree requirements. Each general education core course option must contain high-level academic and critical thinking skills and common competencies that students must demonstrate to successfully complete the course.
<table>
<thead>
<tr>
<th>General Education Learning Outcomes</th>
<th>Communications</th>
<th>Humanities</th>
<th>Mathematics</th>
<th>Science</th>
<th>Social Science</th>
<th>NSE</th>
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</thead>
<tbody>
<tr>
<td>Critical Thinking</td>
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<tr>
<td>Quantitative Reasoning</td>
<td><strong>X</strong></td>
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<tr>
<td>Scientific Reasoning</td>
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<tr>
<td>Written Communication</td>
<td><strong>X</strong></td>
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<tr>
<td>Oral Communication</td>
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<td>Interpersonal Communication</td>
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<td>Ethical Responsibility</td>
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<td>Cultural &amp; Historical Understanding</td>
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<tr>
<td>Information Literacy</td>
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<td></td>
<td></td>
<td><strong>X</strong></td>
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</tbody>
</table>

- **X** indicates the assessment method used.
- All Gen Ed Math Classes
- All Gen Ed Humanities Classes
- All Gen Ed Science Classes
## Critical Thinking

Critical Thinking is applying systematic thinking based on evidence across disciplines, for example, from poetry to chemistry. We think critically by evaluating assumptions in light of data, trying to create explanations, and considering appropriate action steps (Brookfield, 1987). The ability to think critically, in relation to problem solving, is high among employer expectations.

Richard Paul’s (1995) comprehensive model lists seven key components of critical thinking:

1. **Purpose**
2. **Key Questions**
3. **Data**
4. **Concepts**
5. **Implications**
6. **Assumptions**
7. **Point of View**

**Bias**

**Use of Evidence**

**Context**
2013-2014 What we have been learning
Fall 2013: English and Humanities

• Students completed written assignments that the faculty members had piloted and refined over the past three years in English and Humanities

• Over 450 students were assessed.

• The results were documented using the faculty-developed checklist tied to specific outcomes (including Critical Thinking and Written Communication.)
Assignment Instructions HUM2250 – 20th Century Humanities

1) Describe and discuss the impact of (Column A) upon the development of (Column B). Be sure to reference at least one specific example (primary source) of visual art, theater/film, etc., to illustrate your conclusions. You must discuss in detail the historical context of (the specific example used from Column B). Your paper must be between 750-1250 original words in length.

2) Compare and contrast two examples (works) of (Column B) that detail the change in the medium influenced by (Column A). Be sure to reference at least two specific examples (primary sources) of visual art, theater/film, etc., to illustrate your conclusions. You must discuss in detail the historical context of (the specific example used from Column B). Your paper must be between 750-1250 original words in length.

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existentialism</td>
<td>Visual Art</td>
</tr>
<tr>
<td>Freudian Revolution/New Psychology</td>
<td>Literature</td>
</tr>
<tr>
<td>World War(s)</td>
<td>Architecture</td>
</tr>
<tr>
<td>Ethnic/Racial Identity</td>
<td>Philosophy/Religion</td>
</tr>
<tr>
<td>Globalization</td>
<td>Performing Arts</td>
</tr>
<tr>
<td>Modernism</td>
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</tbody>
</table>
Critical Thinking was Assessed: English and Humanities

**Critical Thinking**
Students will be able to effectively analyze, evaluate, synthesize, and apply information and ideas from diverse sources and disciplines.

**Evaluation of Context**
- English 76.7%
- Humanities 76.7%

**Analyzes Assumptions**
- English 73.7%

**Use of Evidence**
- English 63.4%
- Humanities 63.4%

English N= 480
Humanities N= 210
Fall 2013: Student Success (SLS) and Speech

For the first time samples of student work in the Student Success (SLS) courses and in the Speech courses were assessed using the same rubric with a focus on Critical Thinking as well as Oral and Interpersonal Communication outcomes (assessing a total of 1,492 students.)
SLS & Speech: Critical Thinking Assessed in “Central Message” and “Supporting Materials”

II. Central Message:
☐ a. can be deduced, but is NOT EXPLICITLY STATED in the presentation.
☐ b. is BASICALLY UNDERSTANDABLE but is not often repeated and is not memorable.
☐ c. is CLEAR AND CONSISTENT with the supporting material.
☐ d. is COMPELLING (precisely stated, appropriately, repeated, memorable, and strongly supported.)

III. Supporting Materials (explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities) make:

☐ a. insufficient supporting materials make reference to information or analysis that MINIMALLY SUPPORTS the presentation or establishes the presenter’s knowledge on the topic.
☐ b. appropriate reference to information or analysis that PARTIALLY SUPPORTS the presentation or establishes the presenter’s knowledge on the topic.
☐ c. appropriate reference to information or analysis that GENERALLY SUPPORTS the presentation or establishes the presenter’s knowledge on the topic.
☐ d. appropriate reference to information or analysis that SIGNIFICANTLY SUPPORTS the presentation or establishes the presenter’s knowledge on the topic.
Critical Thinking was Assessed: SLS and Speech

Critical Thinking
Students will be able to effectively analyze, evaluate, synthesize, and apply information and ideas from diverse sources and disciplines.

Central Message
(logically derived from critical analysis, etc.)
SLS 65% / Speech 81%

Supporting Materials
(explanations, examples, etc.)
SLS 70% / Speech 74%

SLS N= 691
Speech N= 782
Fall 2013: Science and Math

Students across all of the science courses were invited into the assessment (with 3,255 responding) to take a short online exam that the instructors had piloted and refined over the past two years. Students in Math were also assessed (141) using exam questions that had also been developed and refined prior.
Quantitative Reasoning as Critical Thinking

**Critical Thinking**
Students will be able to demonstrate quantitative reasoning.

<table>
<thead>
<tr>
<th>Task</th>
<th>Average Score in Math</th>
<th>Percentage Scoring 3 or Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classifying and utilizing facts and formulas correctly</td>
<td>2.15</td>
<td>37.5%</td>
</tr>
<tr>
<td>Drawing well-supported conclusions</td>
<td>2.04</td>
<td>31.7%</td>
</tr>
<tr>
<td>Solving using appropriate procedures</td>
<td>2.14</td>
<td>36.5%</td>
</tr>
<tr>
<td>Constructing a mathematical model</td>
<td>2.11</td>
<td>34.6%</td>
</tr>
</tbody>
</table>

N= 141
Scientific Reasoning as Critical Thinking

Critical Thinking
Students will be able to demonstrate scientific reasoning.

Understanding of hypothesis and related inferences
49% scored a three or higher

N= 3,255
Examples - Acting on the Results

Science faculty members developed tutorials over the summer to address areas they want to strengthen related to the Scientific Method. The tutorials are specific to different disciplines within science and are able to be shared with students consistently across all locations. Science work teams were also responsible for designing discipline-specific scenarios for use as college-wide assessments of scientific reasoning that are general enough to be implemented within any of the sciences that a student may be enrolled in during a given term.

Faculty members in the Social Sciences worked in teams over the summer designing an Ethical Reasoning survey with a core set of questions and added items that are discipline-specific. They also looked for a Critical Thinking exam that could be purchased for use with a sample of students in Gen Ed. The three shared Critical Thinking indicators and the Analytical Thinking blue book will provide the foundation for Valencia’s own exam.
Part II The Three Indicators of Critical Thinking in Gen Ed
A Shared Understanding Based on the Blue Book

Critical Thinking

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- Point of View
The Foundations of Analytic Thinking
How to Take Thinking Apart and What to Look for When You Do

The Elements of Thinking
and the Standards They Must Meet
By Dr. Linda Elder and Dr. Richard Paul
“I’ll do my best to fix your car, but frankly I’ve never understood the parts of the engine...”

...what would we think of an auto mechanic who said, “I’ll do my best to fix your car, but frankly I’ve never understood the parts of the engine....”

....or of a grammarian who said, “Sorry, but I have always been confused about how to identify the parts of speech.”

Clearly, students should not be asked to do analysis if they do not have a clear model, and the requisite foundations, for the doing of it.
All Thinking Is Defined by the Eight Elements That Make It Up

- generates purposes
- raises questions
- uses information
- utilizes concepts
- makes inferences
- makes assumptions
- generates implications
- embodies a point of view

Essential Idea: There are eight structures that define thinking. Learning to analyze thinking requires practice in identifying these structures in use.
All Thinking Is Defined by the Eight Elements That Make It Up

- generates purposes
- raises questions
- uses information
- utilizes concepts
- makes inferences
- makes assumptions
- generates implications
- embodies a point of view
All Thinking Is Defined by the Eight Elements That Make It Up

- **Context**
- **Bias**
- **Use of Evidence**

- **Point of View**
  - Frame of reference, perspective, orientation

- **Elements of Thought**
  - **Implications and Consequences**
  - **Assumptions**
    - Presupposition, taking for granted
  - **Concepts**
    - Theories, definitions, axioms, laws, principles, models
  - **Information**
    - Data, facts, observations, experiences
  - **Interpretation and Inference**
    - Conclusions, solutions
For Reflection and Discussion

From the blue book section on “Analyzing the Logic of a Subject.”

Context in my discipline...
- What is the main purpose or goal of studying this subject?
- What are people in this field trying to accomplish?

Evidence in my discipline....
- What types of inferences or judgments do they typically make? (Judgments about...)

Bias in my discipline.....
- What do professionals in this field take for granted or assume?
Consider the three indicators from Valencia’s General Education Program in the Context of your Discipline

Critical Thinking - 2014

<table>
<thead>
<tr>
<th>Context</th>
<th>Overall, this student:</th>
</tr>
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<tbody>
<tr>
<td>1 Critical Thinking - Influence of Context</td>
<td>Examines the relevance of appropriate contexts when presenting ideas.</td>
</tr>
<tr>
<td>2 Critical Thinking – Bias</td>
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</tr>
<tr>
<td>3 Critical Thinking – Use of Evidence</td>
<td>Demonstrates a comprehensive synthesis or analysis of issues, ideas, artifacts, or events.</td>
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</table>

What question might you ask a student in your discipline so you could see whether or not they can apply one of these three skills?
1. **Critical Thinking**: Effectively analyze, evaluate, synthesize, and apply information and ideas from diverse sources and disciplines

2. **Quantitative and Scientific Reasoning**: Use processes, procedures, data, or evidence to solve problems and make effective decisions

3. **Communication Skills**: Engage in effective interpersonal, oral, written communication

4. **Cultural and Historical Understanding**: Demonstrate understanding of the diverse traditions of the world, and an individual’s place in it

5. **Information Literacy**: Locate, evaluate, and effectively use information from diverse sources

6. **Ethical Reasoning**: Demonstrate awareness of personal responsibility in one’s civic, social, and academic life

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**Fall Activities by Program or Discipline**

- **Oct. 10**: Higher Order Thinking & Multiple Choice Question Workshop (East & West)
- **Nov.**: Administer the Pilot Questions. Date grades are due responses given to consultant for analysis.
- **Feb. 6**: Test Item Reliability Presentation (Osceola) methods taught & revised questions administered again in spring.
Workshop template to document faculty-developed Multiple Choice Question (MCQ) items

### Critical Thinking - 2014

<table>
<thead>
<tr>
<th>Overall, this student:</th>
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</thead>
<tbody>
<tr>
<td>1. Critical Thinking - Influence of Context</td>
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<tr>
<td>2. Critical Thinking - Bias</td>
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### Question Development for the General Education Critical Thinking Outcome Assessment

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<tr>
<th>Date:</th>
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<table>
<thead>
<tr>
<th>Your Name and E-mail:</th>
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<table>
<thead>
<tr>
<th>Your Discipline / Program:</th>
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<table>
<thead>
<tr>
<th>The subject area/ discipline specific to this question:</th>
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<table>
<thead>
<tr>
<th>Question:</th>
<th>Possible Answers:</th>
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<table>
<thead>
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<th>a.</th>
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<tr>
<td>b.</td>
<td>Context</td>
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<tr>
<td>c.</td>
<td>Bias</td>
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</table>

Your question should ask students to demonstrate one of the three indicators of critical thinking that faculty members have decided to assess in the General Education program. Please select one of the three below.
The Assessment Workshops

**East Campus**
**Morning Session**
Session Locations: 8-101 & 8-144

- 8:30AM – 9:00AM Light breakfast and refreshments (Room 8-101)
- 9:00AM – 10:00AM Critical Thinking Discussion (Room 8-101)
- 10:00AM – 12:00PM Multiple Choice Question (Room 8-101) or Essay Question Development (Room 8-144)

**West Campus**
**Afternoon Session**
Session Location: 11-106 & 11-216

- 1:30PM – 2:00PM Light snacks and refreshments (Room 11-106)
- 2:00PM – 3:00PM Critical Thinking Discussion (Room 11-106)
- 3:00PM – 5:00PM Multiple Choice Question (Room 11-106) or Essay Question Development (Room 11-216)
Dr. Steven Downing - MCQ

• Dr. Downing received a Ph.D. from Michigan State University in Educational Psychology, specializing in educational measurement and has worked extensively with high stakes testing programs in medicine and the professions.

• Prior to joining the University of Illinois at Chicago faculty in 2001, he was Director of Health Programs at the American College Testing Program, Director of Client Programs and Deputy Vice President at the National Board of Medical Examiners (NBME), Senior Psychometrician and Senior Program Manager for the Institute for Clinical Evaluation at the American Board of Internal Medicine.

• Now retired Prof. Downing consults for various national and international programs in all areas of test development and psychometrics, with particular interest in selected-response formats, test validity issues, testing program evaluation, and computer-based testing. Dr. Downing is the senior editor of the *Handbook of Test Development* (2006) and *Assessment in Health Professions Education* (2009.)