

**CSUS ASSESSMENT OF LEARNING  
FOR EDUCATIONAL IMPROVEMENT GRANT PROGRAM**

**Faculty Grants – Final Report  
Projects Conducted During the 2007-08 Academic Year**

**Instructions** –Your report corresponds to activities conducted during the academic year 2007-08. The report is due on Monday **April 7, 2008 at 5 p.m.** Please submit as an e-mail attachment to [bermudezg@ct.edu](mailto:bermudezg@ct.edu) with a copy to the Assessment Coordinator(s) at your university.

**Please try to keep the formatting of this document as much as possible. If you are copying from another document, please use the “Unformatted Text” or “RTF” options when pasting. Use generic formats as possible for all charts and graphics.**

Institution: Eastern Connecticut State University

Project Title: **Critical Thinking: Argument Mapping in the First Year Program**

Funding Source:

(When in doubt, please consult with the Assessment Coordinator at your university)

System

University

Project Participants: (Please add rows as needed)

<b>Faculty Rank</b>	<b>First Name</b>	<b>Last Name</b>	<b>Dept./Program</b>	<b>e-mail</b>	<b>Phone</b>
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### **ABSTRACT**

Please provide a 100-word abstract of your project:

A one-semester study was conducted concerning the effectiveness of using Argument Mapping concepts with entry level college students as a means to teach and then assess critical thinking. Although the results were inconclusive, they revealed the need for critical thinking instruction for incoming students. The issue was more complex than anticipated as entry level students varied widely in their abilities to understand simple prose arguments. In addition, participating faculty support was found to be crucial. The Holistic Critical Thinking Scoring Rubric (Facione and Facione) appears to be a viable rubric for evaluating the critical thinking skills, with or without the argument mapping.

### **PROJECT OBJECTIVES AND DESIGN**

List the learning goals/outcomes addressed in this project:

Students will:

- Understand the process of critical thinking;
- Demonstrate the ability to state a position, support an argument using logic and reason, and assess the validity of the arguments;
- Visually communicate the rationales for claims and positions; and
- Apply information technology to enhance and demonstrate critical thinking.

Assessment instruments/methodologies used/developed:

Six faculty members teaching eight separate classes participated in the study, assessing critical thinking in both 100-level and 200-level courses in a variety of disciplines. Some of the faculty were assigned to the control group, while others were assigned to the experimental group that was to use argument mapping. Two of the faculty on the Critical Thinking Workgroup also participated, putting one of their sections in the control group and another in the experimental group.

Two general reading selections not related to course content were chosen for pre/post testing. Questions were developed regarding conclusions, points of view, and supporting statements and administered to both experimental and control groups. The investigators served as scorers, selected the reading passages, and developed the questions. Two scorers were used for both pre and post tests. The scorers reviewed and resolved interpretations of the scoring rubric and collaboratively scored a sample of student pre-tests to norm the scoring. Since the rubric was based on a 4 point scale, a third scorer reviewed in cases where the two scores disagreed by 2 points or more.

After selecting the scoring rubric (The Holistic Critical Thinking Scoring Rubric developed by Facione and Facione), an early meeting was spent calibrating our model answers on the pre-test. The scorers similarly reviewed the post-test instrument.

Scores were averaged for both the pre-test and post-test for each student. The pre-test averaged score was subtracted from the post-test averaged score to create the Change variable. Investigators also measured the variation between the two scores in the Pre-Reliability and Post-Reliability variables.

At the end of the project a post-evaluation survey was sent to the experimental faculty to gauge their experience and interest in the project.

Process and activities (no more than about 500 words) –Please include a description of the analysis of the assessment information you used:

The initial intention was to work with volunteers from the First-Year Program to measure the effectiveness of argument mapping in teaching first-year students critical thinking skills. Being unable to find sufficient volunteers at the 100-level, faculty who were teaching classes at the 200-level were enlisted as well.

Two scorers were assigned to each student's pre-test and post-test, making sure that faculty on the Critical Thinking Workgroup did not score their own classes. After designing the pre-test and post-test based on relatively simple argumentative passages, one meeting was spent reviewing the rubric and calibrating answers for the pre-test. A third scorer reviewed in cases where the two scores disagreed by 2 points or more. The scores were then averaged for both the pre-test and post-test for each student. The pre-test averaged score was subtracted from the post-test averaged score to create the Change variable. The variation between the two scores in the Pre-Reliability and Post-Reliability variables was also measured.

A total of 143 students took the pretest with a mean score of 2.5 and a median score of 2.25. Fewer students, 118, participated in the post-test with a mean score of 2.4 and a median of 2.5. Of the 118 students, 115 students were identified as participating in both the pre and post-assessments. The pre-test data illustrates the wide variation in student abilities to understand even relatively simple arguments. A stem-and-leaf diagram of the distribution of the averaged pre-test scores showed a relatively normal distribution around the median of 2.25. A comparative box plot suggests that students in the 200-level courses tended to score a slight bit lower with the pre-test argument than those in the 100-level courses (a median of 2.25 versus 2.3), although given the variation between scorers, a margin of 0.5 or less is probably not significant. In the post-test, the 200-level students did perform slightly better than their 100-level peers, although this too is well within the variation between scorers. A comparison of the averaged pre and post-test scores suggests very little change overall.

The post-evaluation survey was sent to the experimental faculty to gauge their experience and interest in the project. Several points are worth highlighting: First, the process was rarely used in the classes of the experimental groups although one of the investigators provided a 30-45 minute introduction to argument mapping at the beginning of each course. Second, two of the four professors in the experimental group reported not using the process at all, while two reported using it "Somewhat." The software was apparently used by almost none of the students. In short, there was little interest in argument mapping from three of the four experimental faculty members.

The final analysis of the project will be posted at <http://www.jostwald.com/ArgumentMapping/index.htm>.

### **SIGNIFICANT PROJECT OUTCOMES, IMPROVEMENT STEPS AND FUTURE WORK** (no more than about 250 words, please respond to all questions that apply to your project)

#### What was learned from the project?

- Entry level students vary widely in their abilities to understand simple prose arguments.
- Students taking 200-level courses were, overall, no better at understanding arguments than those taking 100-level courses.
- In this study the *average* student saw no practical improvement over the course of the term, and was as likely to do worse as to do better.
- Faculty will not use the process if they do not believe in it.
- The Holistic Critical Thinking Scoring Rubric developed by Facione and Facione appears to be a viable method for evaluating the critical thinking process.
- More study needs to be done to determine the effectiveness of using the argument mapping process to teach critical thinking.

#### What improvements are proposed to enhance student learning?

- Students need to be taught to identify and understand simple prose arguments as part of Liberal Arts courses.
- Faculty need to actively support development of critical thinking skills.

What improvements are proposed to enhance the assessment process?

Based on the results of this study,

- More training needs to be provided for participating faculty in Argument Mapping.
- Time should be included within each course to train students in the process and provide practice on using critical thinking skills.
- The framing of pre and post-test questions needs to be more consistent to prevent confusion.
- Critical thinking and argument mapping processes should be reinforced throughout the course.
- More time should be allowed for administering the assessment.

What other areas of learning should be addressed?

- Critical thinking as an integral part of all aspects of a liberal arts education.
- Student reading for comprehension.
- Developing multiple perspective thinking.
- A specific course in critical thinking is being proposed.

**PLEASE PROVIDE ANY FEEDBACK YOU WISH TO IMPROVE THIS GRANT PROGRAM**

It would have been beneficial to have had more time to implement the study and process the data. The project would have benefitted from having the fall semester to recruit more interested faculty and provide additional training as well as revise course syllabi to include the project. The investigators did not realize fully the implementation requirements until the semester and project were underway. That, of course, is the fault of the investigators, but having a full 12 months to implement the study might have provided some differing results.

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