



Office of Institutional Research

To: Scholarship Action Group and Curriculum Committee
 CC: Stephen Siciliano
 From: Darby Hiller
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 Subject: CAAP After Action Report – Spring 2005

Introduction

In February 2005, selected faculty and members of the Scholarship Action Group administered the CAAP Critical Thinking test in 25 courses to 456 students. The courses were chosen at random from those courses that support the critical thinking general education outcome.

Key Findings

- 67% of students scored above the national average (75% at or above)
- Strongest skill was analysis of the elements of an argument
- Weakest skill was extending an argument and drawing conclusions
- Five students had perfect score (32 out of 32 answered correctly)
- Near-graduates outperformed freshmen and sophomores

Methodology and Instrument

The CAAP Critical Thinking test is intended to measure students' skill in clarifying, analyzing, evaluating, and extending arguments. An argument is defined as a sequence of statements that includes a claim that one of the statements, the conclusion, follows from the other statements. The four passages in the test present a series of sub-arguments, overlapping positions, statistical arguments, experimental results, or editorials about which students answer 32 multiple choice questions. Twenty questions measure analysis of the parts of an argument. Six questions each measure evaluation of an argument and extension of an argument, respectively. These three different skills correspond to different capabilities on the NMC critical thinking rubric.

Capability	Language in Critical Thinking Rubric	Language in CAAP Technical Handbook
1	Identifies arguments	Analysis of the elements of an argument
2	Demonstrates understanding of different perspectives	Evaluates an argument
3	Uses information	
4	Applies reasoning	Extends an argument
5	Draws conclusions	

Results

On average, students answered 14 of the 20 analysis questions correctly (70%), 3.6 out of 6 correctly on the evaluation questions (60%), and 3.4 out of 6 on the extension questions (57%) (Table 1). The weakest area was in drawing conclusions and extending the argument.

Table 1	N	Minimum	Maximum	Mean	Std. Deviation
analysis	456	4	20	13.86	3.673
evaluation	456	0	6	3.61	1.450
extension	456	0	6	3.41	1.545

Previous research has shown that these skills are part of a packaged skill set that build on one another. This finding is confirmed by a regression analysis. Scores on the analysis questions was significantly related to evaluation and extension even after controlling for number of NMC credit hours and overall gpa. The same was true for evaluation as the dependent variable and extension as the dependent variable. If a student was able to answer over half of the questions in a certain skill set it was assumed that she mastered the skill. Of those students answering more than half of the analysis questions correctly (80%), 65% mastered the evaluation questions. For those mastering analysis and evaluation questions (52%), 67% mastered the extension questions. Overall, 35% of our students mastered all three skills (Table 2).

Table 2 Trend comparison	Spring 2005 (N=456)	Fall 2003 (N=152)	Fall 2002 (N=120)
Analysis mean (of 20)	14.0	13.1	13.4
Evaluation mean (of 6)	3.6	3.6	3.2
Extension mean (of 6)	3.4	3.5	3.5
Mastering analysis (%)	80%	74%	87%
Mastering analysis and evaluation (%)	52%	51%	52%
Mastering all three skills (%)	35%	36%	44%
Perfect scores	5	0	0
Percent scoring <u>above</u> the national average for 2-yr colleges	67%	60%	60%

Exposure to NMC Curriculum

The students were divided into three groups to test the effect of increasing exposure to NMC's curriculum: 1) freshman (with 0-30 credit hours), 2) sophomores (31-51 credits), and 3) near graduates (52 or more credit hours).

Students with greater exposure to the NMC curriculum did better than those with less exposure (Table 3). The means among the three student classes are significantly different for analysis of an argument and extension of an argument. So that, near-graduates are significantly more likely to score better than the other classes, and sophomores are significantly more likely to score better than freshmen. Typically, gpa is used as a measure of overall student ability. A regression analysis shows that number of credit hours is not a significant predictor of student performance on the analysis and evaluation skills when gpa is controlled

for. But both hours and gpa are significant predictors of students' ability to extend an argument. We could be more confident that NMC's curriculum was helping to teach critical thinking skills if the hours variable was consistently significant. However, it seems that these data show that better students are more likely to perform better on the test. Where NMC experience comes into play is in the students' ability to draw conclusions. In fall 2003, neither credit hours nor gpa was a significant predictor of students' overall critical thinking scores. Fall 2002 results were similar to spring 2005, only gpa was a significant predictor.

Table 3. Class differences	Analysis*	Evaluation	Extension*
Freshman (N=258)	13.41	3.53	3.19
Sophomore (N=91)	14.34	3.64	3.55
near-graduate (N=106)	14.56	3.80	3.82

(Note: asterisk denotes a significant difference between classes)

What This Tells Us

With this large sample of students we are able to generalize the results to students enrolled in courses that support the critical thinking general education outcome. The descriptive statistics for this administration were similar to previous years, signifying that even those smaller samples were fairly representative of our students in critical thinking courses. When compared to the national average for 2 yr colleges, a majority of students have consistently scored better. The artifact scoring assessment results from spring 2005 showed that drawing conclusions was one of the weaker critical thinking skills. That finding is confirmed by these CAAP critical thinking test results, as well. Students have improved in their ability to evaluate an argument which was previously identified as a weak area. While we break the skills of critical thinking down into five capabilities for measurement purposes, the skills are not practiced exclusively and are highly correlated. This suggests that students may not be able to work on one skill in particular, and that the outcome must be learned as a skill set.

Upperclassmen with more exposure to the NMC curriculum are significantly more likely to do better than freshmen. However, experience drops out as a significant predictor when gpa is controlled for. This may be because those with more NMC credits tend to have higher gpas but the correlation is not strong and tests for collinearity proved that the correlation was not a problem in the regression equations (VIF=1.0). Therefore, we cannot be certain from the evidence that increasing NMC experience is facilitating the learning of critical thinking skills. While many factors may play a role in scores on the critical thinking test (such as reading ability), these data show that better students do better on the test, and students who do better in one part of the test tend to do better on subsequent parts of the test. Future research could try to take into consideration better measures for how exposure to NMC curriculum plays a role in students' performance (exposure to critical thinking courses). Moreover, future research could take into consideration other variables that could contribute to students' ability, such as COMPASS reading scores, etc.

If you have questions or comments about this report and the analyses please contact the Office of Institutional Research, 995-1084 or dhiller@nmc.edu.