

# CRITICAL THINKING ASSESSMENT



## REPORT

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## Critical Thinking Assessment at MXC

As part of its assessment plan, the Assessment Committee decided to look at students in developmental education in comparison with students in capstone courses. The original critical thinking assessment did not focus on these student populations. Enrollment trends at the College indicate that approximately 65% of entering students test into developmental reading and 91% writing courses, and 96% test into developmental math courses.

To gather baseline data on developmental students, the committee decided to use the CAAP test. The objective was to determine whether our general education core curriculum contribute to an increase in the skills and knowledge that our students are supposed to acquire in the area of critical thinking.

It was decided to use CAAP because it is a standardized, nationally normed assessment program from ACT that enables postsecondary institutions to *assess*, *evaluate*, and *enhance* the outcomes of their general education programs. The test is a 32-item test that measures students' skills in analyzing, evaluating, and extending arguments.

The Critical Thinking test is composed of three content categories:

- Analysis of Arguments,
- Evaluation of Arguments, and
- Extension of Arguments.

To implement this initiative, the committee used two groups of students:

- Incoming students enrolled in lower level courses, usually developmental courses, were tested during fall 2010
- Students in capstone courses in various disciplines and departments were then tested with the same instrument. This phase of the Student Learning Project focused on those students who had completed the majority of their course work at Malcolm X College (spring 2011).

### Fall 2010 Administration

The track 2 project during fall 2010 included 12 sections. Seven sections were from mathematics (Math 098 with 3 sections, and M099 with 4 sections). The English department included 5 sections (ENG 098 with 2 sections and ENG 100 with 3 sections). A total of 272 students participated in the study. This number represented the number of participants needed to achieve the 95% Confidence Level at the Margin of Error selected.

The results indicated a mean of 55.07 with a standard deviation of 3.937.

## Spring 2011 Administration

The spring administration included 17 sections with a total of 350 students participating in the study. Several departments participated in this study: from the general education division, Mathematics and English participated with 6 sections, totaling 173 students enrolled in Math 118 and ENG 102. Career programs included: Respiratory Therapy (15 students), Nursing (80 students), Radiology (25 students), Child Development (10 students), Mortuary Science (15 students), Surgical Technology (10 students), Renal Technology (10 students) and Emergency Medical Technology (12 students).

The mean score showed 57.25 with a Standard Deviation of 4.857.

Some of the demographic variables that we collected included ethnicity, gender, age, language, education level, enrollment status (full time, part time), educational plans, and GPA. We will further analyze these variables to create benchmarks.

## Analysis

After reviewing the test results, we were concerned about whether or not there was a statistical difference between the score of students in their freshman year and those who were already in higher level courses.

When we compared the scores between the two groups, a difference was evident between the lower classes of the distribution and the higher classes. For example, a lower number of students in the higher level courses scored in the second class compared to students in the entering class (freshmen). Likewise, a higher number of students scored higher in the upper class of the distribution.

Class	Spring 2011	Fall 2010
45 - 49	3%	5%
50 - 54	30%	49%
55 - 59	39%	33%
60 - 64	20%	11%
65 - 69	6%	2%
70 >	2%	0%
	<b>350</b>	<b>272</b>

The results indicate that at  $\alpha = 0.05$  levels, the results were statistically significant. The results suggested that there is a clear difference between the two groups.

**Between Groups Statistics**

Group	N	Mean
Spring 2011	350	57.25
Fall 2010	272	55.07

We also compared students who had been at the institution 6 or more semesters (Spring 2011) with freshmen (Fall 2010)

Group	N	Mean
Spring 2011	147	57.40
Fall 2010	272	55.07

The results indicated that at  $\alpha = 0.05$  levels, the results were statistically significant. The results suggested that there is a clear difference between the two groups.

Students with 4 or 5 semesters at MXC (Spring 2011) were also compared with freshmen (Fall 2010)

Group	N	Mean
Spring 2011	51	57.57
Fall 2010	272	55.07

The results also indicated that at  $\alpha = 0.05$  levels, the results were statistically significant. The results suggested that there was a distinctive difference between the two groups.

Further analysis with the group of students who had been at the institution for at least 3 semesters (Spring 2011) with freshmen (Fall 2010) indicated that there is a statistically significant difference between the two groups

Group	N	Mean
Spring 2011	103	56.55
Fall 2010	272	55.07

When we compared students with 2 semesters or less at MXC (Spring 2011) with freshmen (Fall 2010), the findings also indicated a statistical difference.

Group	N	Mean
Spring 2011	49	56.22
Fall 2010	272	55.07

The results also were compared with national results. These results indicated that we are below the mean for two-year institutions. The national percentage is based on CAAP-tested sophomores at two-year institutions.

Group	Mean
MXC	57.30
National	60.70

## Reflecting on CAAP Critical Thinking Scores

	Fall 2010	Spring 2011
National mean	60.7	60.7
MXC mean	55.1	57.3
Difference (National minus MXC)	5.6	3.4
National Standard Deviation	5.4	5.4
MXC Standard Deviation	3.9	4.9
Difference (National minus MXC) in standard deviation units	1.5	0.5
National Number of students	26,264	26,264
MXC Number of students	272	350

Overall, results indicate that:

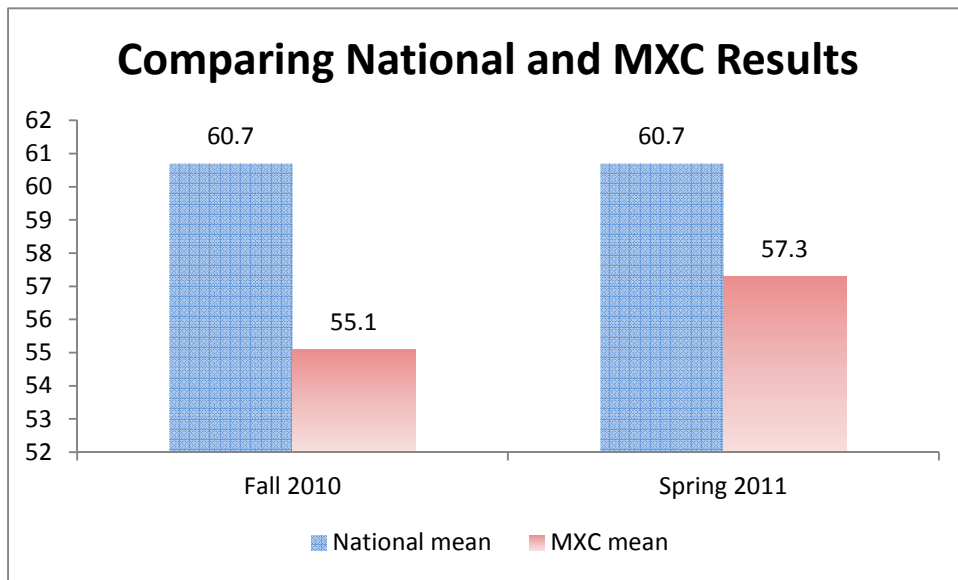
- There was a difference on MXC students' critical thinking skills from a national sample of students at other two-year public institutions.
- There was a change in students' critical thinking skills from students in the lower course levels compared to those in higher level courses.
- There were meaningful differences in critical thinking skills between different student groups of MXC students.
- Sample sizes for various student groups were very small and national averages for different student groups were not available; therefore, data by student demographic characteristics should be interpreted very cautiously.

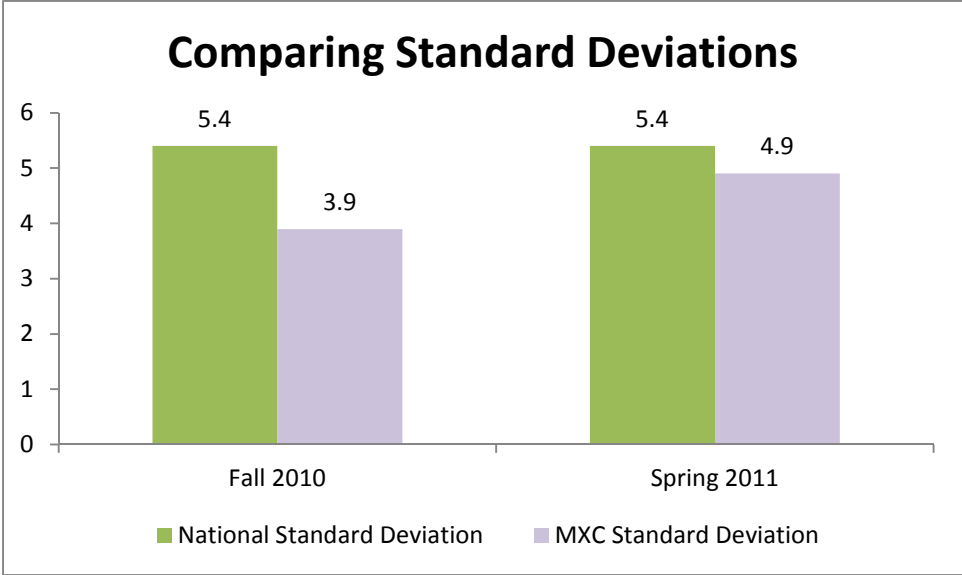
It is important to note that we had some data limitations to be considered in the interpretation and use of results. For example, students were asked to provide information about their level of effort using the following categories:

- Tried my best
- Gave moderate effort
- Gave little effort
- Gave no effort
- No response

The report included results of chance scores. These are the predicted scores that students would obtain if they responded to all test questions by guessing. Students who indicated that they “tried their best” and had a very low score (i.e., below chance level) may in fact lack the skills or knowledge to perform adequately on the CAAP.

## Graphical Representation





## Next Steps – Closing the Loop

For the analysis of the results and the implementation of new assessment initiatives, we need to remember that these studies are correlational in nature (as opposed to causal). In other words, it is important to keep in mind that there are correlations between scores on critical thinking instruments and hours completed at MXC. As this fact is considered a positive finding; we must remember that we can only assert that both scores increase at the same time. We cannot assert that one causes the other. At the same time, as we review the results and realize that some of them are statistically significant, keep in mind that, when we have a large number of participants, statistical significance becomes easier to find. Thus, we must also look at the effect size. For instance, a critical thinking score may be a significant predictor of grades in a Philosophy course. However, it may only predict 2% of the variance (effect size).

## Recommendations for maximizing the usefulness of results

The following list is not exhaustive and it only represents some general ideas. Each department/program can develop their own goals and objectives regarding critical thinking and its assessment.

- Examine the curriculum map (General Ed and Careers) to determine where exactly the Critical Thinking student learning outcome is placed.
- Determine what characteristics critical thinking display at MXC.
- Identify what courses introduce and reinforce critical thinking skills.
- Administer the CAAP in courses that enroll a large proportion of students who have completed critical thinking courses.
- Examine how many test respondents who have taken critical thinking courses score during the new CAAP administration.
- Compare students who have completed the critical thinking curriculum to those who have not.
- Compare how students perform on each of the various content areas of the test.
- Determine the actions to be taken for curriculum development and improvement.
- Identify strengths and/or weaknesses in specific critical thinking skills (e.g., analysis of arguments, evaluation of arguments, and extension of arguments).
- For continuous improvement, establish test administrations that target specific level gains and develop an action plan to achieve this goal.
- Collect data from a larger sample of students (or collect data every other year with a larger sample), in order to have greater confidence in the representativeness of results and to have sufficient data to permit analysis on different student groups.
- Identify the amount of value added that we expect from students' academic performance for a period of five to ten years.