

Focusing on LMU's Undergraduate Learning Outcomes: Creative and Critical Thinking

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Loyola Marymount University is committed to understanding and improving student learning. In early 2010 LMU adopted Undergraduate Learning Goals and Outcomes. Each year, the Assessment Committee will select one to two Undergraduate Learning Outcomes to examine. In this fourth year (2013-2014), we have chosen to focus on both the Oral Communication and Creative and Critical Thinking outcomes. This report summarizes the evidence of student achievement of the **Creative and Critical Thinking** outcome: **Students will be able to ask questions, solve problems and produce works through the innovation of ideas and concepts and by developing and justifying solutions through critical evaluation and analysis.**

The Office of Assessment administered a direct measure of Creative and Critical Thinking, the Critical thinking Assessment Test developed by faculty at Tennessee Tech University. This report summarizes this evidence, as well as student responses to related questions on two indirect measures, the 2012 National Survey of Student Engagement and the 2012 Alumni Outcomes Survey.

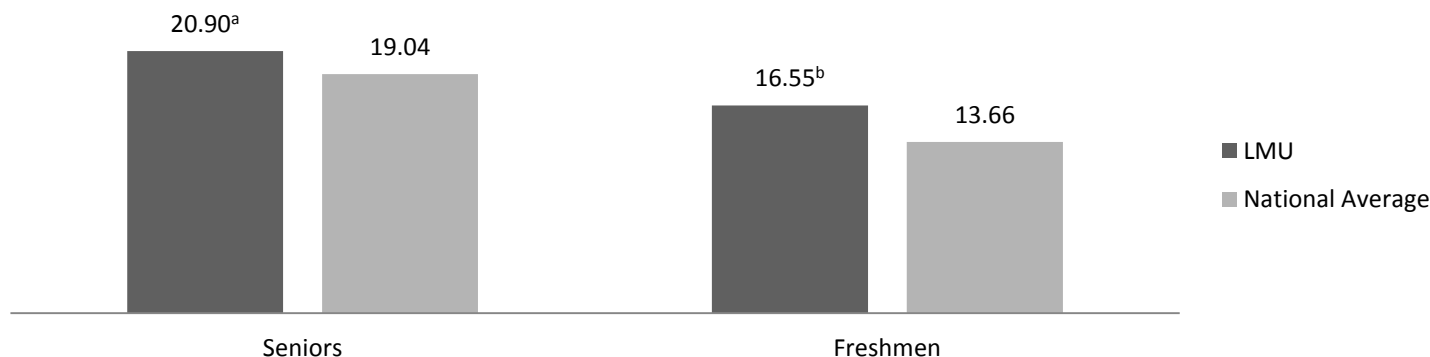
Direct Evidence: Critical thinking Assessment Test (CAT)

The CAT was designed to both assess and promote the improvement of critical thinking, creativity and problem solving skills. The test questions are derived from real-world situations and most require short answer essay responses. Although there is no time limit on the test, most students complete it in 30 – 45 minutes. The Office of Assessment partnered with two faculty to lead the testing and scoring processes on campus.

The CAT was administered to a random sample of 91 freshmen during the first few weeks of the fall 2012 semester, and to a random sample of 107 seniors during the spring 2013 semester. The freshmen sample was obtained through a random sampling of sections of Freshmen English; these students took the CAT during a scheduled class meeting. To obtain the senior sample, a random sample of all seniors was drawn and these students were invited to attend a testing session. Seniors were offered \$20 for their participation. The tests were then scored by ten faculty following the CAT's detailed scoring guide; to avoid bias in scoring, faculty scorers were 'blind' to the class standings of the test takers.

Out of a possible 38 points on the CAT, the average LMU freshmen score was 16.55 (SD=4.74). The average LMU senior score was significantly higher than the freshmen score, at 20.90 (SD=5.35). Seniors scored higher than freshmen on 14 of the 15 test items, and significantly so on 9 of the 15 test items. The Appendix presents detailed information about the skills assessed by each of the 15 items on the CAT, and provides a comparison of LMU's freshmen and senior scores for each item on the test.

The average CAT scores for LMU freshmen and seniors were significantly higher than the national averages for undergraduates at 4-year institutions:



^a. $p < .01$, effect size = +.33

^b. $p < .001$, effect size = +.58

Indirect Evidence: 2012 National Survey of Student Engagement (NSSE)

The NSSE assesses the extent to which students engage in educational practices associated with high levels of learning and development. The data provided here are from LMU’s spring 2012 participation.

Five items on the NSSE pertain to the Creative and Critical Thinking outcome. With only one exception, both LMU freshmen and senior average scores on these five items are on par with or significantly higher than comparator scores. The exception comes from the average score of freshmen asked to evaluate the extent to which LMU has contributed to their ability to solve complex real-world problems. In this case, LMU freshmen reported a significantly lower average score than that reported by their peers in the Jesuit Consortium.

To what extent has your experience at this institution contributed to your ability to:					
1 = Very little, 2 = Some, 3 = Quite a bit, 4 = Very much		Mean Response			
		LMU	Jesuit	Masters	NSSE Total
Think critically and analytically	FY	3.34	3.38	3.24*	3.27
	SR	3.45	3.51	3.38	3.40
Solve complex real-world problems	FY	2.67	2.78*	2.71	2.74
	SR	3.02	2.96	2.84*	2.87*

*Please note that these scores are significantly different from the corresponding LMU score, $p < .05$

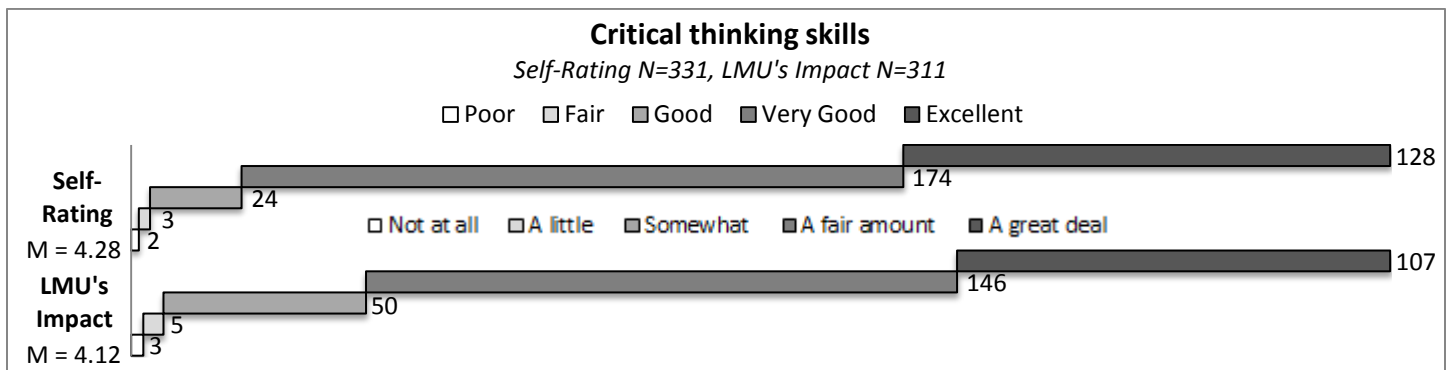
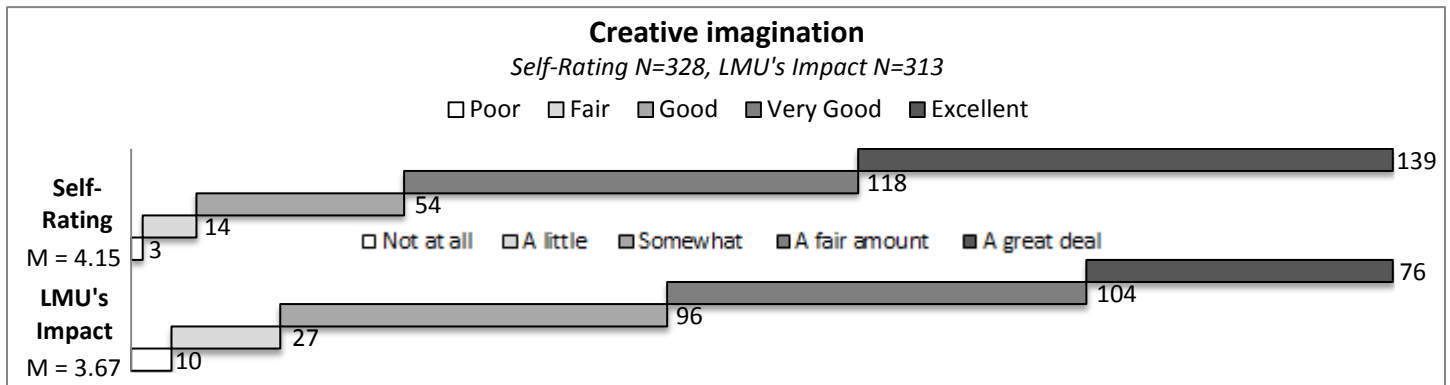
During the school year, how much has your coursework emphasized:					
1 = Very little, 2 = Some, 3 = Quite a bit, 4 = Very much		Mean Response			
		LMU	Jesuit	Masters	NSSE Total
Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components?	FY	3.43	3.34*	3.17*	3.20*
	SR	3.39	3.43	3.31*	3.33
Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions?	FY	3.08	3.06	2.96*	2.97*
	SR	3.13	3.20	3.09	3.09
Applying theories or concepts to practical problems or in new situations?	FY	3.11	3.19	3.07	3.11
	SR	3.27	3.35	3.27	3.28

*Please note that these scores are significantly different from the corresponding LMU score, $p < .05$

Indirect Evidence: 2012 Alumni Outcomes Survey

In January 2012 members of the classes of 2004 and 2009 were invited to participate in an Alumni Outcomes Survey. Alumni were asked to rate their abilities, knowledge, and skills (referred to as 'Self-Rating') and indicate the extent to which LMU contributed to their development in these areas (referred to as 'LMU's Impact'). Respondents were asked to evaluate their 'creative imagination' skills separately from their 'critical thinking' skills.

For creative imagination, approximately 78% (n = 257) rated their own skills as 'Very Good' or 'Excellent,' and about 58% (n = 180) indicated that LMU contributed to the development of their creative imagination skills 'A fair amount' or 'A great deal.' For critical thinking, approximately 91% (n = 302) of alumni surveyed rated their own skills as 'Very Good' or 'Excellent,' and about 81% (n = 311) indicated that LMU contributed to the development of their critical thinking skills 'A fair amount' or 'A great deal.' The charts below provide the mean score (M) and counts for each response category for these items:



Summary

The combination of evidence from the CAT, the NSSE, and the Alumni Outcomes Survey suggests that our students are generally achieving the **Creative and Critical Thinking** outcome. Both LMU freshmen and seniors did well on the CAT relative to the national norm, and our seniors did significantly better on the test than our freshmen. A closer inspection of the skills measured by each item (as presented in the Appendix) may help us to better understand student strengths and areas for improvement within this outcome.

On the NSSE, both freshmen and senior experiences were similar to those of their peers within our comparison groups. The one exception was that freshmen reported that LMU contributed less to their ability to solve complex real-world problems than their peers at other Jesuit institutions.

Finally, responses on the Alumni Outcomes Survey indicate that our alumni feel confident in their creative imagination and critical thinking skills, but it is of note that LMU's impact score for creative imagination was among the lowest on the survey.

In evaluating this evidence it is important to consider the educational experiences we provide to help our students achieve the Creative and Critical Thinking outcome. For example, while the outgoing Core had a critical thinking outcome, the new Core lists creative and critical thinking as a learning goal of the Core, and weaves both creative and critical thinking outcomes throughout the curriculum. While all students will develop these skills through the Core, it is also important that we consider the extent to which creative and critical thinking skills are reinforced throughout each major's curriculum.

Improving Student Learning

Discussing this report with faculty and/or staff in your program will help you determine what program level actions are needed to improve student achievement of the **Creative and Critical Thinking** outcome. If you have evidence of learning for a related program outcome, you might include it in your discussion of the University evidence.

As you review the Creative and Critical Thinking evidence, here are a few questions that you might consider:

- For which components of Creative and Critical Thinking do you feel students demonstrated satisfactory levels of achievement?
- For which components of Creative and Critical Thinking do you feel students are in need of improvement?
- Does your program's curriculum contain a creative and/or critical thinking component? If so, what kinds of pedagogies and assignments are used to develop students' abilities to ask questions, solve problems and produce works through the innovation of ideas and concepts and to develop and justify solutions through critical evaluation and analysis?
- What modifications to your program's approach to integrating creative and critical thinking into the curriculum might help students to improve on the components you identified as needing improvement?
- What contributions might your program make to help students achieve the related creative and critical thinking outcomes through the new University Core Curriculum?

For more details about this report, please visit:

www.lmu.edu/about/services/academicplanning/assessment/University_Assessment_Reports.htm

Appendix

Comparison of LMU Freshmen and Senior Scores on Critical thinking Assessment Test (CAT) Items

Skill(s) Assessed by CAT Item			Item #	CAT Item Requirements	Freshmen Mean	Senior Mean	Significance ^a	Effect size ^b
Evaluating & Interpreting Information	Problem Solving	Creative Thinking						
X			1	Summarize the pattern of results in a graph without making inappropriate inferences.	0.49	0.68	**	+0.39
X			2	Evaluate how strongly correlational-type data supports a hypothesis.	0.89	1.40	***	+0.48
		X	3	Provide alternative explanations for a pattern of results that has many possible causes.	0.88	1.45	***	+0.59
	X	X	4	Identify additional information needed to evaluate a hypothesis.	1.33	1.55		
X			5	Evaluate whether spurious information strongly supports a hypothesis.	0.68	0.81	*	+0.31
		X	6	Provide alternative explanations for spurious associations.	1.34	1.72	***	+0.52
	X	X	7	Identify additional information needed to evaluate a hypothesis.	0.64	0.95	***	+0.59
X			8	Determine whether an invited reference is supported by specific information.	0.51	0.83	***	+0.73
		X	9	Provide relevant alternative interpretations for a specific set of results.	0.81	0.96		
X	X		10	Separate relevant from irrelevant information when solving a real-world problem.	3.16	3.13		
X	X		11	Use and apply relevant information to evaluate a problem.	1.18	1.28		
	X		12	Use basic mathematical skills to help solve a real-world problem.	0.79	0.81		
X	X		13	Identify suitable solutions for a real-world problem using relevant information.	0.97	1.22	*	+0.29
X	X		14	Identify and explain the best solution for a real-world problem using relevant information.	2.22	2.73		
	X	X	15	Explain how changes in a real-world problem situation might affect the solution.	0.66	1.37	***	+0.79
CAT Total Score					16.55	20.90	***	+0.86

Note. Definitions of the skills assessed by the CAT, as well as development and technical information for the test can be found: <http://www.tntech.edu/cat/home/>

^a. * $p < .05$, ** $p < .01$, *** $p < .001$ (2-tailed)

^b. Effect size indicates the “practical significance” of the mean difference. It is calculated by dividing the mean difference by the pooled standard deviation. (0.1 – 0.3 = small effect; 0.3 – 0.5 = moderate effect; >.05 = large effect)