

SUNY Cortland General Education Category 1 Quantitative Skills Assessment Results, Spring 2016¹

Methodology

Sampling

In November 2015, class sections were randomly selected from all General Education (GE) 1 sections (section n = 43, students = 1068)², until the selected sections had a total student enrollment of at least 30% of all the sections (selected section n=13, students =343).

Recruitment, Administration, and Instrument

Faculty teaching the selected sections were contacted in December 2015 and requested to participate in the assessment process during the Spring 2016 semester. Faculty were asked, using an assessment instrument of their determination, to rate the work of the students in their sections on the following scale – 2=Target, 1=Acceptable, or 0 = Unacceptable – on each learning outcome in the GE 1 category (rubric in Appendix).

Sample Modifications

During the assessment process, the originally selected sample (13 sections, 343 students) was modified in two ways:

1. Two sections were removed from the selected sample at the requests of two department chairs and replaced with two new random selections.³
2. Four sections taught by adjuncts were removed at direction of provost.

Response

Data on a total of 9 sections, 210 students, was received from faculty and analyzed. This reflected 21% (=9/43) of the set of all the GE1 sections from Banner described under Sampling and 20% (=210/1068) of all students in these sections. Results below are based on the data received. Data from 2011 is also compared to that from 2016.

¹ Updated 8/9/16.

² Using Banner job submission with cross-checks against online catalog.

³ In consultation/communication with GE Committee Chair, Associate Provost.

Results

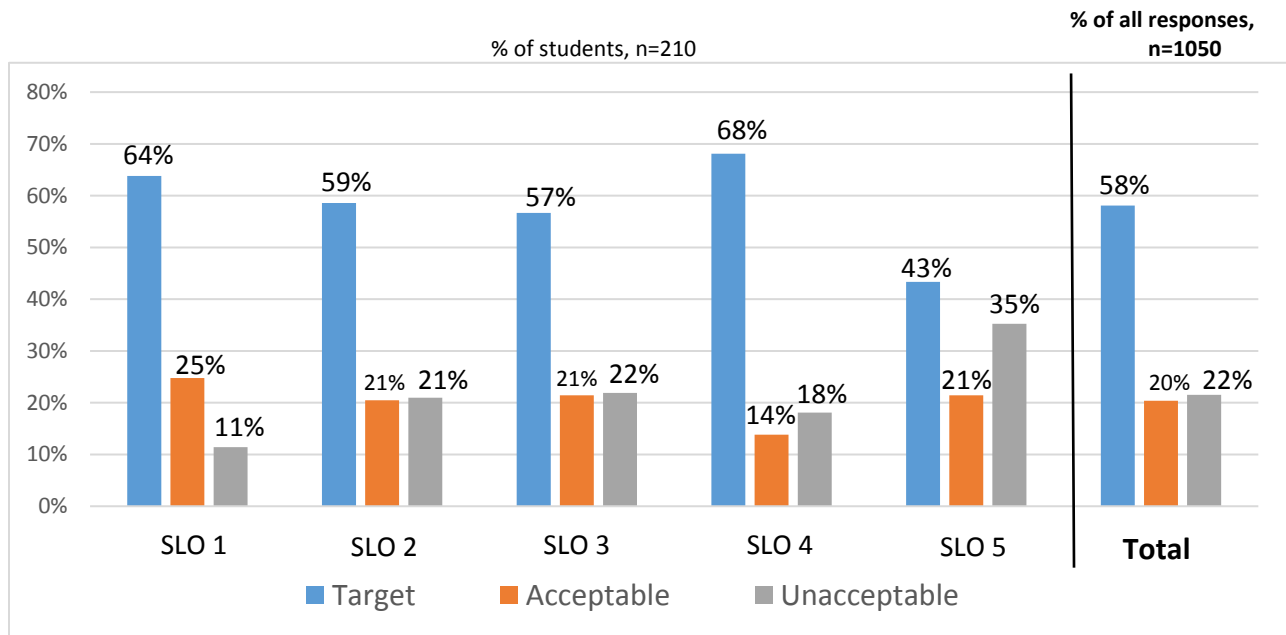
Table 1. GE 1 2016 Assessment Results: Number and Percent of Students Receiving Scores of Target, Acceptable, or Unacceptable by Student Learning Outcome*

Student Learning Outcome (SLO)	Score Received	Number of Students	Percent of Total
SLO1: Interpret and draw inferences from mathematical models	Target	134	64%
	Acceptable	52	25%
	Unacceptable	24	11%
	Total	210	100%
SLO2: Represent mathematical information symbolically, visually, numerically, & verbally	Target	123	59%
	Acceptable	43	21%
	Unacceptable	44	21%
	Total	210	100%
SLO3: Employ quantitative methods	Target	119	57%
	Acceptable	45	21%
	Unacceptable	46	22%
	Total	210	100%
SLO4: Estimate & check mathematical results for reasonableness	Target	143	68%
	Acceptable	29	14%
	Unacceptable	38	18%
	Total	210	100%
SLO5: Recognize the limits of mathematical & statistical methods	Target	91	43%
	Acceptable	45	21%
	Unacceptable	74	35%
	Total	210	100%
All 5 SLO's Combined	Score Received	Number of Responses	Percent of Total
	Target	610	58%
	Acceptable	214	20%
	Unacceptable	226	22%
	Total	1050	100%

*Notes

- Rubric in Appendix.
- As described under Response, data is from a total of nine GE 1 sections.
- In one section of 19 students, two values apparently linked to two questions both measuring outcome 3 were provided by the instructor. With instructor consent, these were averaged to produce a final single value for the learning outcome for these 19 cases. Two of these averages had to be rounded up to the nearest whole score.
- Percentages rounded to nearest whole percent, sums may not equal exactly 100 due to rounding.

Figure 1. GE 1 2016 Assessment Results: Percent of Students Receiving Scores of Target, Acceptable, or Unacceptable by Student Learning Outcome (from Table 1) *



Interpret and draw inferences from mathematical models	Represent mathematical information symbolically, visually, numerically, & verbally	Employ quantitative methods	Estimate & check mathematical results for reasonableness	Recognize the limits of mathematical & statistical methods	All 5 SLOs Combined
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***Notes**

- Rubric in Appendix.
- As described under Response, data is from a total of nine GE 1 sections.
- In one section of 19 students, two values apparently linked to two questions both measuring outcome 3 were provided by the instructor. With instructor consent, these were averaged to produce a final single value for the learning outcome for these 19 cases. Two of these averages had to be rounded up to the nearest whole score.
- Percentages rounded to nearest whole percent, sums may not equal exactly 100 due to rounding.

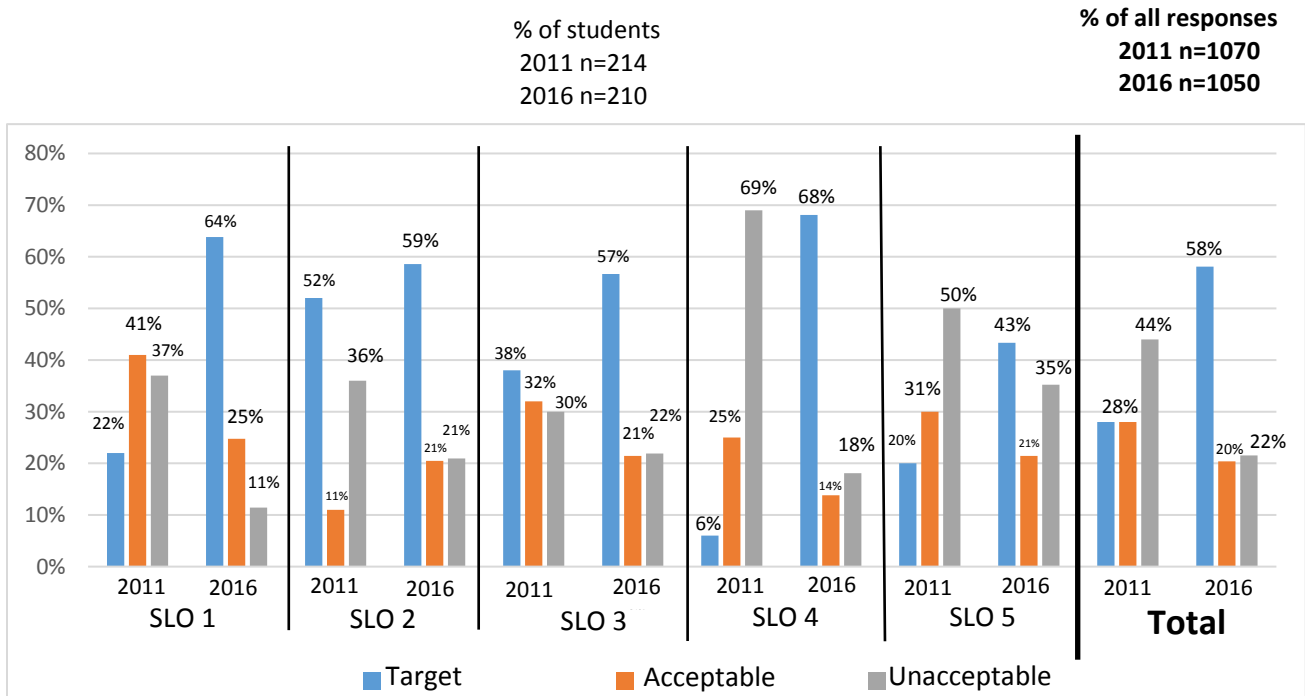
Table 2. Comparison of GE 1 2011 and 2016: Number and Percent of Students Receiving Scores of Target, Acceptable, or Unacceptable by Student Learning Outcome *

Student Learning Outcome (SLO)	Score Received	2011		2016	
		Number of Students	Percent of Total	Number of Students	Percent of Total
SLO1: Interpret and draw inferences from mathematical models	Target	47	22%	134	64%
	Acceptable	88	41%	52	25%
	Unacceptable	79	37%	24	11%
	Total	214	100%	210	100%
SLO2: Represent mathematical information symbolically, visually, numerically, & verbally	Target	112	52%	123	59%
	Acceptable	24	11%	43	21%
	Unacceptable	78	36%	44	21%
	Total	214	99%	210	100%
SLO3: Employ quantitative methods	Target	81	38%	119	57%
	Acceptable	69	32%	45	21%
	Unacceptable	64	30%	46	22%
	Total	214	100%	210	100%
SLO4: Estimate & check mathematical results for reasonableness	Target	13	6%	143	68%
	Acceptable	53	25%	29	14%
	Unacceptable	148	69%	38	18%
	Total	214	100%	210	100%
SLO5: Recognize the limits of mathematical & statistical methods	Target	42	20%	91	43%
	Acceptable	66	31%	45	21%
	Unacceptable	106	50%	74	35%
	Total	214	101%	210	100%
All 5 SLO's Combined	Score Received	Number of Responses	Percent of Total	Number of Responses	Percent of Total
	Target	276	28%	610	58%
	Acceptable	300	28%	214	20%
	Unacceptable	475	44%	226	22%
	Total	1070	100%	1050	100%

*Notes

- 2011 data taken from 2011 GE1 report on Web. Totals calculated here.
- 2016
 - As described under Response, data is from a total of nine GE 1 sections.
 - In one section of 19 students, two values linked to two questions both measuring outcome 3 were provided by the instructor. With instructor consent, these were averaged to produce a final single value for the learning outcome in these 19 cases. Two of these averages had to be rounded to the nearest whole score.
 - Percentages rounded to nearest whole percent, sums may not equal exactly 100 due to rounding.
- 2011 and 2016
 - Rubric in Appendix.
 - Large data differences on Student Learning Outcome 4 between 2011 and 2016 double checked. No errors found.

Figure 2. Comparison of GE 1 2011 and 2016: Percent of Students Receiving Scores of Target, Acceptable, or Unacceptable by Student Learning Outcome (SLO) (from Table 2) *



Interpret and draw inferences from mathematical models	Represent mathematical information symbolically, visually, numerically, & verbally	Employ quantitative methods	Estimate & check mathematical results for reasonableness	Recognize the limits of mathematical & statistical methods	All 5 SLOs Combined
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***Notes**

- 2011 data taken from 2011 GE1 data report on Web. Totals calculated here.
- 2016
 - As described under Response, data is from a total of nine GE 1 sections.
 - In one section of 19 students, two values linked to two questions both measuring outcome 3 were provided by the instructor. With instructor consent, these were averaged to produce a final single value for the learning outcome in these 19 cases. Two of these averages had to be rounded to the nearest whole score.
 - Percentages rounded to nearest whole percent, sums may not equal exactly 100 due to rounding.
- 2011 and 2016
 - Rubric in Appendix.
 - Large data differences on Student Learning Outcome 4 between 2011 and 2016 double checked, no errors found.

Appendix

SUNY Cortland General Education Quantitative Skills Rubric

Elements	Target	Acceptable	Unacceptable
SLO 1: Interpret and draw inferences from mathematical models	The student demonstrates the ability to interpret and draw inferences that accurately represent the model or answer the question.	The student demonstrates the ability to interpret and draw inferences, but they are incomplete or inaccurate due to a minor conceptual flaw(s).	The student's interpretations and inferences are missing, incomplete, or inaccurate due to a major conceptual flaw(s) or do not address the question in any meaningful way.
SLO 2: Represent mathematical information symbolically, visually, numerically, & verbally	The student employs the required representations to display mathematical information (e.g. format, language, labels, scales, terminology, etc.). The response may have minor copying or labeling errors.	The student's representations to display mathematical information are lacking due to a minor conceptual or computational flaw(s).	The student's representations to display mathematical information are missing, or incorrect due to a major conceptual or computational flaw(s), or do not address the question in any meaningful way.
SLO 3: Employ quantitative methods	The student demonstrates an understanding of the problem by using a clear and logical method to solve the problem. The solution may contain minor copying or labeling errors.	The student demonstrates understanding of the problem and the correct method but the implementation is partially incorrect. The solution may contain a minor computational flaw(s).	The student's response was missing, incomplete, or incorrect, demonstrating little to no understanding of the problem. The solution contains a major computational flaw(s) or shows little or no correct work.
SLO 4: Estimate & check mathematical results for reasonableness	The student can completely and accurately estimate and justify a mathematical result to a problem.	The student can estimate and justify a mathematical result to a problem, but the student's response contains a minor conceptual flaw.	The student can estimate and justify a mathematical result to a problem, but the student's response contains a major conceptual flaw, or the student's response does not address the question in any meaningful way.
SLO 5: Recognize the limits of mathematical & statistical methods	The student provides a clear and accurate description of the assumptions/simplifications of a mathematical or statistical method.	The student provides a description of the assumptions/simplifications of a mathematical or statistical method, but the response contains a minor conceptual flaw.	The student provides a description of the assumptions/simplifications of a mathematical or statistical method, but the response contains a major conceptual flaw, or the student fails to realize that the results are not contextually appropriate.

Learning Outcome 1: Students will demonstrate the ability to interpret and draw inferences from mathematical models such as formulas, graphs, tables, and schematics.

Learning Outcome 2: Students will demonstrate the ability to represent mathematical information symbolically, visually, numerically, and verbally.

Learning Outcome 3: Students will demonstrate the ability to employ quantitative methods such as arithmetic, algebra, geometry, or statistics to solve problems.

Learning Outcome 4: Students will demonstrate the ability to estimate and check mathematical results for reasonableness.

Learning Outcome 5: Students will demonstrate the ability to recognize the limits of mathematical and statistical methods.