Quantitative Literacy Assessment
Fall 2015

Method:

Quantitative Literacy was assessed through the collection of samples of student work. Thirteen courses were selected for assessment (see Table 1), which comprised 182 individual classes. Two students from each of the classes were randomly selected for assessment, for a total of 364 students.

Instructors for the selected courses were sent an email notification within the first month of classes with instructions for submitting pieces of student work and the names of their selected students. Instructors were asked to send samples of work from the selected students that demonstrated the ability to select and apply mathematical tools to draw conclusions from quantitative data. Attached to the email notification was a copy of the rubric that would be used in the assessment to better assist instructors in selecting appropriate pieces of student work. Instructors were also asked to submit a copy or brief description of the assignment in order to assist the assessors in evaluating the student work. Work could be submitted electronically or in paper form. If work could not be submitted, instructors were asked to indicate the reason for the lack of submission, such as the student dropped the course or did not complete the selected assignment. Based on early instructor feedback, it was determined that BIOL 221 and CHEM 204 did not require assignments that met the criteria for evaluation, and were excluded from the assessment. A reminder email was sent to all instructors of selected courses approximately two weeks before the due date for submissions.

All collected artifacts were anonymized and uploaded into the Tk20 assessment software program. A group of seven volunteers assessed the artifacts using the rubric. The analytic rubric consisted of four dimensions: Provides reasoning, identifies and explains quantitative information, performs computations correctly, and converts relevant information into various forms. The dimensions were rated on a 5-point Lykert-type scale, ranging from 4, expert proficiency, to 0, no proficiency. Each artifact was assessed twice, by two different volunteers. In addition, the artifacts were divided into two groups based upon the selected students' earned credits. One group comprised students who had earned zero to 30 credits, and the second group over 30 credits. All assessors were assigned to both credit groups in order to avoid possible bias introduced by disparate assessors assigned between the credits group. Bias was also deterred by

requiring assessors to attend a norming session in which five artifacts were communally assessed.

Course	Number of Classes
MATH 103	42
MATH 119	6
MATH 104	9
MATH 122	3
MATH 111	13
BIOL 221	49
CHEM 101	13
CHEM 204	2
METR 101	12
NUTR 104	22
EXSC 203	1
ECON 202	8
ENGR 213	2

Table 1. Courses selected for assessment of quantitative literacy

Results

Artifacts were submitted for 165 students (45.3%). Artifacts could not be collected from 43 (11.8%) of the selected students because the students either dropped the course or did not turn in the assignment chosen for assessment. In addition, the two courses determined to be inappropriate for the assessment (BIOL 221 and CHEM 204) constituted many classes (51), resulting in a large number of samples being excluded from the assessment (102, 28.0%). The remaining artifacts were not submitted for various reasons, including artifacts being submitted after the assessment deadline. Rubric scores for the assessed students are shown in Table 2. Note that row counts do not total the number of assessed students because each student was assessed twice.

Table 2. Frequency table of rubric scores for all assessed students

Criteria	4-Expert Proficiency	3-Advanced Proficiency	2-Proficiency	1-Limited Proficiency	0-No Proficiency	NA/Missing Score	**Mean (SD)**
Provides reasoning	5(1.8%)	49(17.3%)	72(25.4%)	62(21.9%)	25(8.8%)	70(24.7%)	1.75(1.01)
Identifies and explains	4(1.4%)	62(21.9%)	56(19.8%)	55(19.4%)	29(10.2%)	77(27.2%)	1.79(1.08)
Performs computations	36(12.7%)	59(20.8%)	43(15.2%)	79(27.9%)	22(7.8%)	44(15.5%)	2.03(1.25)
Converts relevant info	3(1.1%)	66(23.3%)	51(18.0%)	36(12.7%)	14(4.9%)	113(39.9%)	2.05(1.00)

When assessed students were split into two groups based upon total credits, 98 artifacts were submitted for students who had 30 credits or less and 67 artifacts were submitted for students with over 30 credits. Scores for students with 30 credits or less were compared to students with more than 30 credits using independent samples *t*-tests. No significant differences in criteria scores were found. Scores on all criteria for the credit groups are shown in Table 3.

	Credits	**Rubric Score**					**Mean (SD)**
		4	3	2	1	0	
Provides reasoning	0-30	3(1.8%)	35(20.8%)	44(26.2%)	42(25.0%)	13(7.7%)	1.80(1.0)
	Over 30	2(1.7%)	14(12.2%)	28(24.3%)	20(17.4%)	12(10.4%)	1.66(1.0)
Identifies and explains	0-30	2(1.2%)	39(23.2%)	30(17.9%)	37(22.0%)	16(9.5%)	1.79(1.1)
	Over 30	2(1.7%)	23(20.0%)	26(22.6%)	18(15.7%)	13(11.3%)	1.79(1.1)
Performs computations	0-30	20(11.9%)	39(23.2%)	26(15.5%)	45(26.8%)	16(9.5%)	2.01(1.3)
	Over 30	16(13.9%)	20(17.4%)	17(14.8%)	34(29.6%)	6(5.2%)	2.06(1.2)
Converts relevant info	0-30	2(1.2%)	40(23.8%)	32(19.0%)	17(10.1%)	10(6.0%)	2.07(1.0)
	Over 30	1(.9%)	26(22.6%)	19(16.5%)	19(16.5%)	4(3.5%)	2.01(1.0)

Table 3. Frequency table of rubric scores categorized by assessed students' credits