CAL MARITIME

IW

AC

Annual Learning Results
Institution Wide SLO (C): Quantitative Reasoning
2014

Prepared by The Institution-Wide Assessment Committee
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1. Executive Summary:

In the Academic Year 2013-2014 the IWAC conducted an assessment of the institution-wide student learning objective, Quantitative Reasoning. Data was gathered from assessments done by faculty in their courses for departmental review. Data was gathered primarily from the Science and Math department as its faculty teach quantitative reasoning to every major on campus. These courses are mostly taken by lower-division students. Assessment scores were aggregated by major, graduation year, gender, and the assessment artifact used.

Results:

The benchmark was that 70% of students receive scores of 4 or above on a 6-point rubric or 3 or above on a 5 point rubric.

1. When aggregated by major, all majors meet the goal except FET. FET is close to the benchmark and had the smallest set of data, so this could be a statistical deficiency.
2. When aggregated by class (graduation year), all classes meet desired outcome. Upper class students had better performance.
3. When aggregated by gender, both genders meet desired outcome with little difference.
4. When aggregated by artifact (course where data comes from) the percentage of students that meet the outcome varies widely.

Recommendations:

1. The IWAC believes that the FET data should be refined with further assessment over the next year. If the benchmark is still not met (or no new data is available), the department should have conversations about how to raise their scores and/or increase participation.

2. The IWAC recommends that more data be gathered for the next Quantitative Reasoning IW-SLO assessment cycle. The data would be improved by including more upper-division courses, and by using more standardized rubrics. However, every new data point will be gathered by faculty volunteers, so care must be taken to keep the burden light to maximize participation.

2. Closing the Loop: Status of Proposed Action Items

	Next Step #1
a) "Next Steps"	There were no proposed action items prior to this assessment cycle.
b) Status of Next Steps	

3. What do We Want Students to Learn?

	Evidence #1
a) UW-SLO	Quantitative Reasoning
b) Learning Criteria: (specific qualities desired in student work)	Use numerical information to identify, analyze and solve problems.
c) Standards for Success	Desired outcome: 70% of students receive scores of 4 or above on a 6-point rubric or 3 or above on a 5 point rubric. Required outcome: Consistent "acceptable" score averages, even when disaggregated by course level and type.

4. What Evidence do We Use to Assess Their Learning?

a) Evidence: Describe summative evidence you analyze & the size of the sample	4 Courses, each course contributed one or more quantitative exam problem to be assessed. There were a total of 392 problems assessed from 4 courses.
b) Assessment Tool/Method	Rubrics used to score all problems. Students were scored by their instructors, in most cases using artifacts gathered for departmental assessment. Some rubrics used a 6 point scale while some used a 5 point scale.
c) Assessment Process	1. Faculty chose an assignment 2. Faculty uses the "Analytical Rubric" to generate numerical score. 3. Faculty recorded each score on an Assessment Score Sheet. 4. Data analyzed using a spreadsheet.

5. How Well Are They Learning? (And SO WHAT?)

a) Results of Student Learning	1. When aggregated by major, all majors meet goal except FET. FET is close to the benchmark and had the smallest set of data, so this could be a statistical deficiency. 2. When aggregated by class, all classes meet desired outcome. Upper class students had better performance. 3. When aggregated by gender, both genders meet desired outcome with little difference. 4. When aggregated by artifact (course where data comes from) the percentage of students that meet the outcome varies widely.
b) Achieving Standards: Did your program achieve its standards for success?	Overall Yes. The only group of students that did not meet the benchmark is the FET major. Other majors (BA, GSMA, ME, MET, MT), all classes (2014-2015), and all genders meet benchmark.
c) Discussion of Results for Program Improvement	Results are good. Before suggesting improvements we should see if low-performing major's results are due to the small sample size, seek additional data.
d) Participants in Discussing/Reviewing Results	Michael Holden, Cynthia Trevisan, Steven Runyon, Julie Chisholm, Colin Dewey, Dianne Meredith, Graham Benton
e) Communication of Results	This report will be housed in the IWAC database and made available through Cal Maritime's website on IWAC-SLOs, 2013-2014, currently housed in the WASC Accreditation site.

5. Now What? (Plan to Improve Our Program)

	Proposed Change #1	Proposed Change #2	
a) Proposed Changes	Seek more data, that can be compared easily	Seek FET data to complete this set, verify results	
b) Rationale for Proposed Changes	Small number of courses represented. Some assessment on a 6 point scale, some on a 5 point scale.	Small number of courses represented.	
c) Proposed Completion Date	End of next 4 year IWAC cycle starting 2016-2017	Summer 2015	
d) Stakeholders Involved	Core Faculty	FET Faculty	
e) Vetting to Stakeholders	IWAC	Mike Holden	
f) Shepherding Changes	IWAC	Mike Holden	
g) Budget Integration	n/a	n/a	
h) Incorporating Changes			
i) Improvement Target Goals	Statistically valid sample sizes in all groups aggregated.	Gather departmental assessment data from FET courses if it exists. If benchmark is not met, meet with faculty to discuss improvements.	
j) Evidence of effectiveness	Number of students sampled	Number of students sampled, benchmark results with new data.	

6. Reflection on Assessment Process

	Reflection #1	Reflection #2	
a) Strengths	Using assessment data generated for departmental review was efficient use of faculty time.	Having faculty assess material from their own classes is efficient and requires no technical knowledge from the IWAC committee.	
b) Modifications	Strive for more uniformity of assessment techniques, more participation, particularly in upper division courses.	Difficult to achieve uniform norming of assessment without burdening faculty.	

7. What do We Want Students to Learn?

a) UW-SLOs	Use numerical information to identify, analyze and solve problems

Section 2: Description of Rubrics and Scoring Analysis

Quantitative Reasoning was assessed using data from 6 courses, most with more than one section of students, for a total of 392 assessment scores in the data set. The assessment was performed by the instructors and reported to the IWAC committee. The committee would like to thank the faculty who submitted data. As each course and instructor had his or her own method, the reports from the individual department will be included in the appendix.

Overall Pass/Fail Numbers:

Pass-Fail Percentages by:						
Major	BA-BS	FET-BS	GSMA-BA	ME-BS	MT-BS	MET-BS
	85%	67%	97%	76%	79%	90%
Artifact	CSLO-3A	CSLO-3B	ENG 250	MTH 212-CA	MTH 212-TI	PHY 205
	84%	81%	88%	54%	64%	97%
Class	2014	2015	2016	2017		
	90%	95%	78%	79%		
Gender	M	F				
	81%	83%				
Overall	81%					

Number of Assessments by:						
Major	BA-BS	FET-BS	GSMA-BA	ME-BS	MT-BS	MET-BS
	26	17	24	131	49	61
Artifact	CSLO-3A	CSLO-3B	ENG 250	MTH 212-CA	MTH 212-TI	PHY 205
	133	81	44	31	29	32
Class	2014	2015	2016	2017		
	9	40	129	130		
Gender	M	F				
	273	35				
Overall	350					

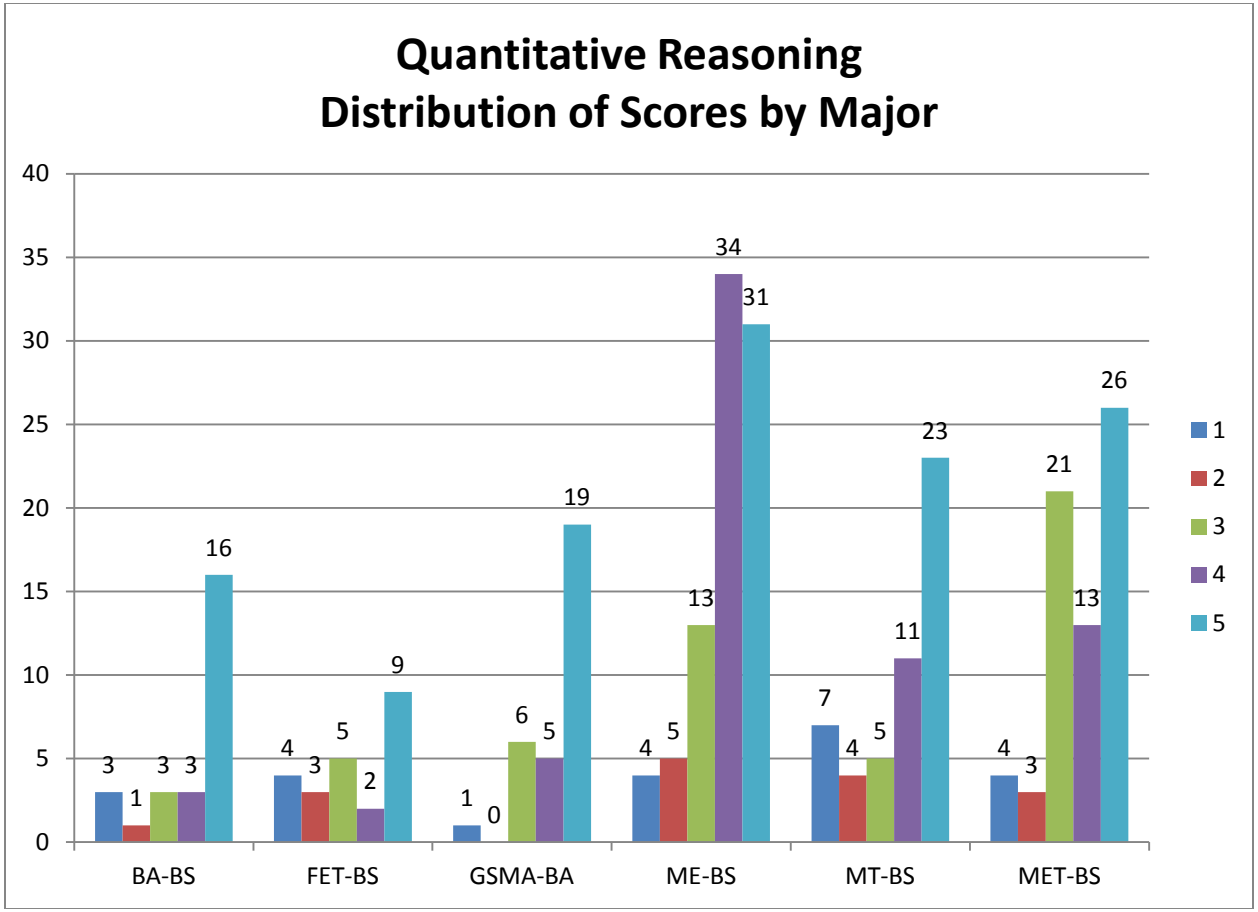
Rubric Score Distribution Aggregated Data

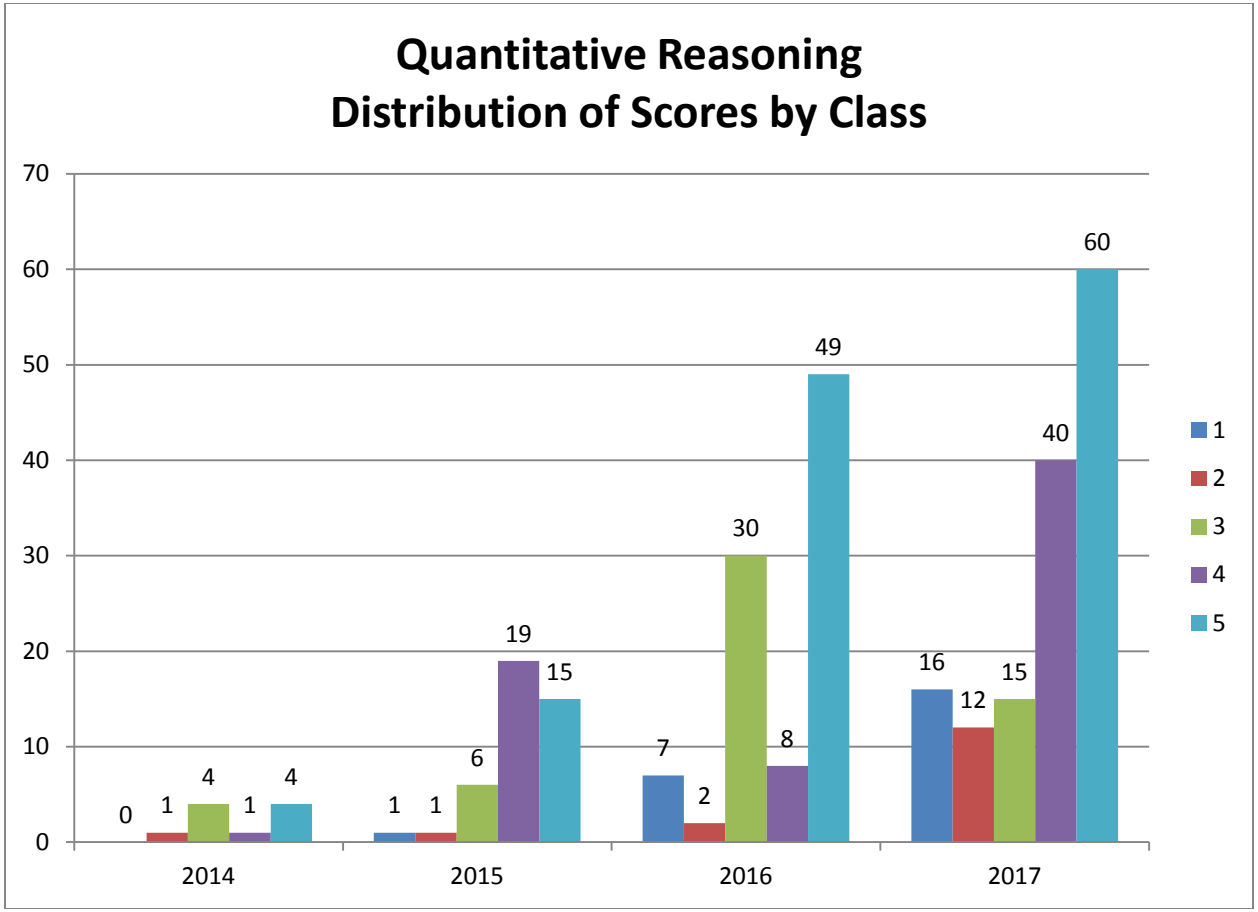
Major	1	2	3	4	5
All Majors	29	17	59	69	149
BA-BS	3	1	3	3	16
FET-BS	4	3	5	2	9
GSMA-BA	1	0	6	5	19
ME-BS	4	5	13	34	31
MT-BS	7	4	5	11	23
MET-BS	4	3	21	13	26

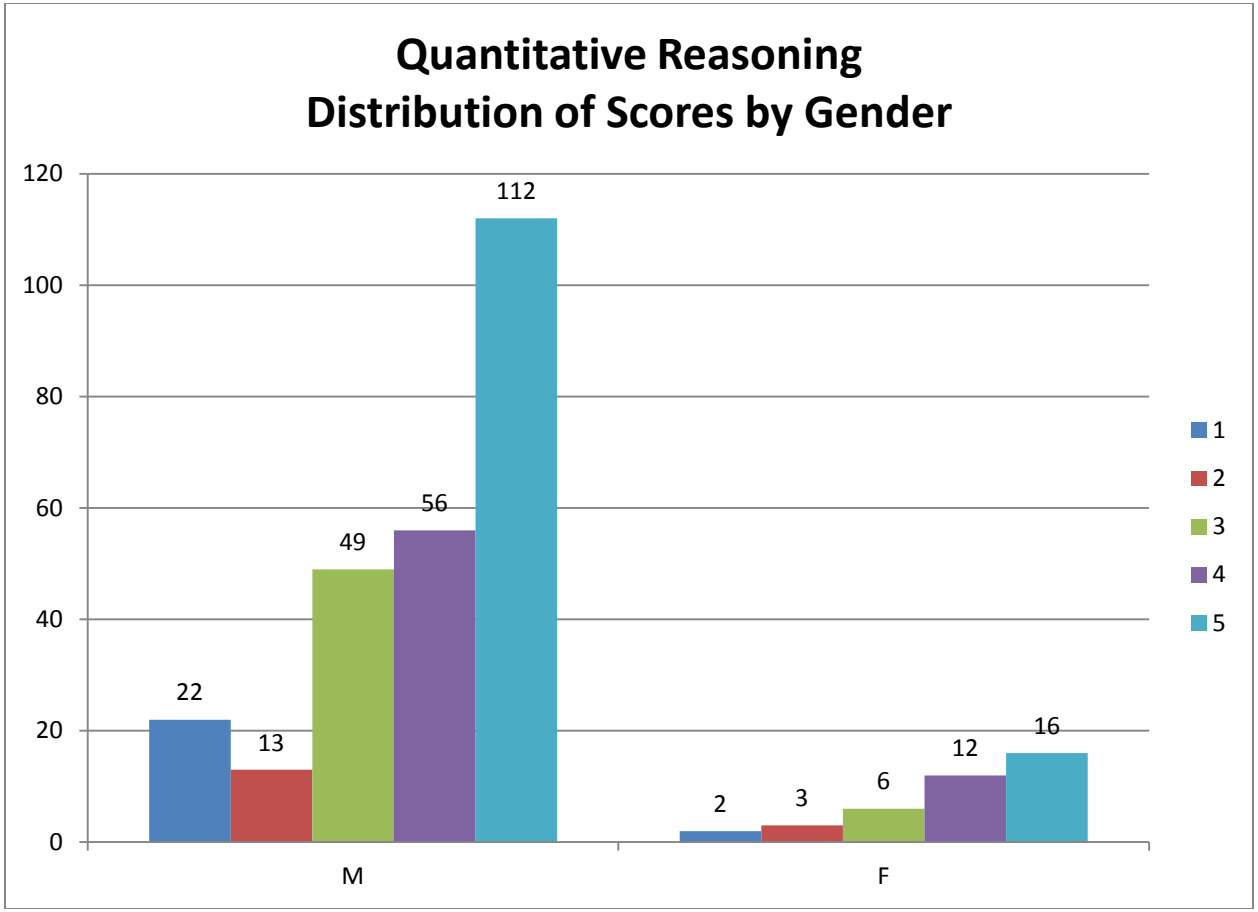
Artifact	1	2	3	4	5	6	Note
	1	2	3	4	5		
CHEM 1 3A	11	11	10	27	86		
CHEM 1 3B	13	4	14	23	36		
ENG 250	4	2	12	19	12		
PHY 205	1	0	23	0	15		
MTH 212-CA	2	1	13	1	5	13	Out of 6
MTH 212-TI	2	0	10	1	0	20	Out of 6

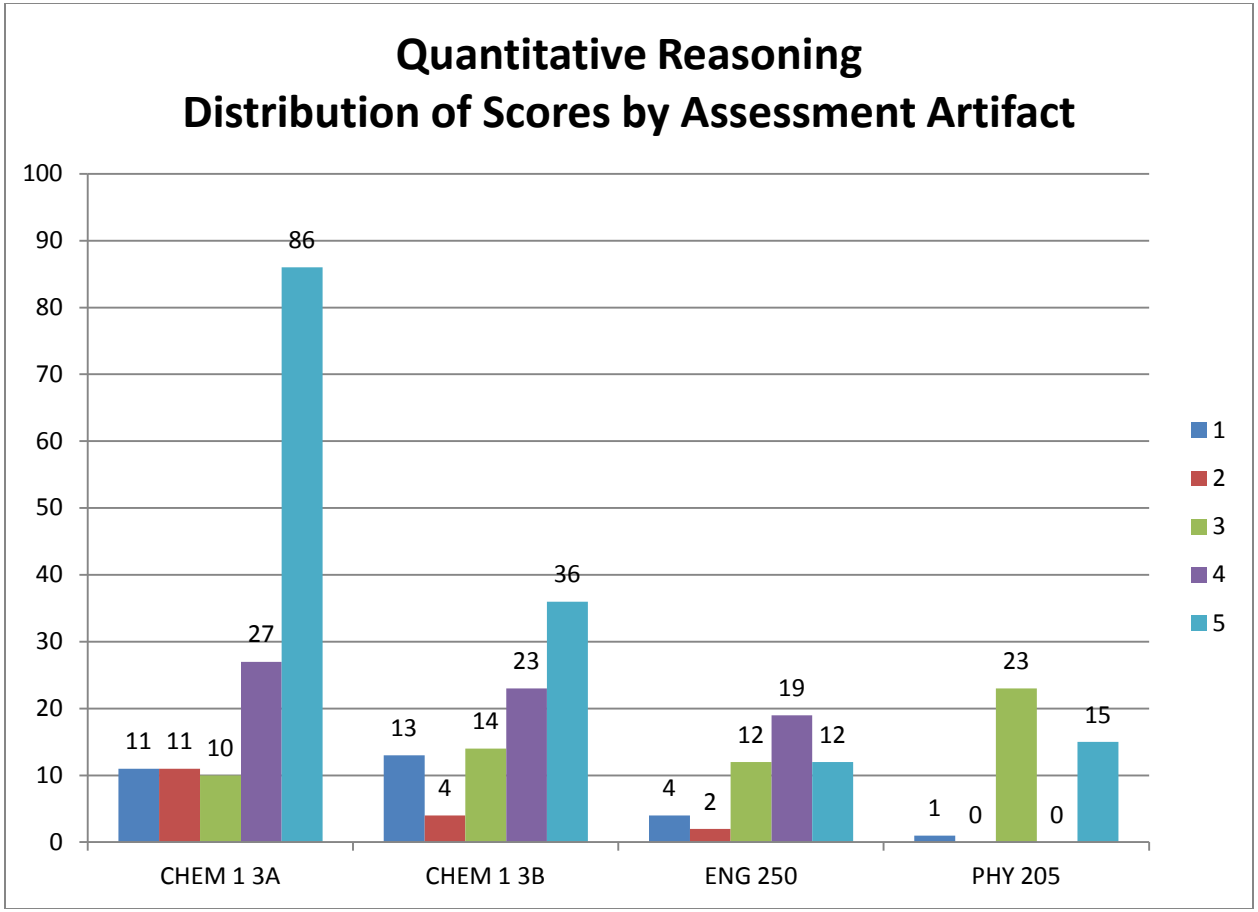
Class	1	2	3	4	5
2014	0	1	4	1	4
2015	1	1	6	19	15
2016	7	2	30	8	49
2017	16	12	15	40	60

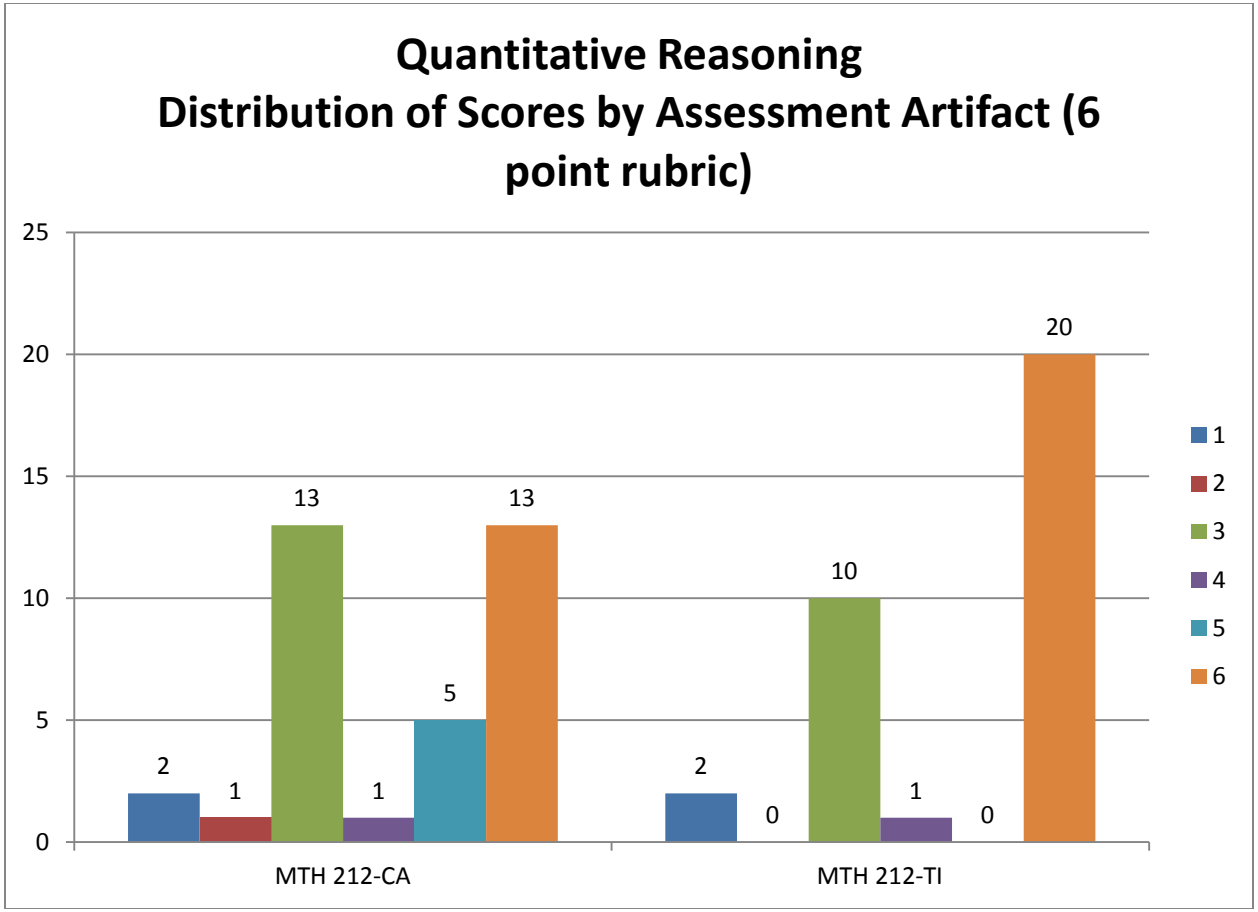
Gender	1	2	3	4	5
M	22	13	49	56	112
F	2	3	6	12	16


Quantitative Reasoning
Distribution of Scores by Major
40
35
30
25
20
15
10
5
0
BA-BS
FET-BS
GSMA-BA
ME-BS
MT-BS
MET-BS
1
2
3
4
5
3 1 3 3 16
4 3 5 2 9
1 0 6 5 19
4 5 13 34 31
7 4 5 11 23
4 3 21 13 26


Quantitative Reasoning
Distribution of Scores by Class
70
60
50
40
30
20
10
0
0
1
4
1
4
1
1
6
19
15
7
2
30
8
49
16
12
15
40
60
2014
2015
2016
2017
1
2
3
4
5


Quantitative Reasoning
Distribution of Scores by Gender
120
100
80
60
40
20
0
22
13
49
56
112
2
3
6
12
16
M
F
1
2
3
4
5


Quantitative Reasoning
Distribution of Scores by Assessment Artifact
100
90
80
70
60
50
40
30
20
10
0
11 11 10 27 86
13 4 14 23 36
4 2 12 19 12
1 0 23 0 15
CHEM 1 3A
CHEM 1 3B
ENG 250
PHY 205
1
2
3
4
5


Quantitative Reasoning
Distribution of Scores by Assessment Artifact (6 point rubric)
25
20
15
10
5
0
2
1
13
1
5
13
2
0
10
1
0
20
MTH 212-CA
MTH 212-TI
1
2
3
4
5
6

Section 4: Departmental Reports from data sources.

The data in these documents are not sufficiently anonymous for a public document. The appendix will be kept by the IWAC committee and may be seen by approved personnel.