General Education Program Assessment

Critical Thinking Skills Assessment:

An assessment of Student Learning across multiple Courses and multiple Disciplines using the AAC&U Critical Thinking Skills Value Rubric.

Spring 2015 – Spring 2017

EMPORIA STATE UNIVERSITY

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INTRODUCTION

The Emporia State University General Education Program has six goals that define the foundations of a Liberal Arts Education. One of these goals is dedicated to students developing the ability to think critically and analytically about an issue, an idea, or a problem. Students should be able to identify and define an issue, an idea, or a problem; gather analyze, and evaluate relevant and reliable information from diverse perspectives; and formulate and support a well-reasoned argument, perspective or conclusion.

The Association of American Colleges and Universities through its Liberal Education & America's Promise (LEAP) program also asserts that intellectual and practical skills including critical and creative thinking are essential learning outcomes for students' pursuing postsecondary education credentials.

Congruently, the development of critical thinking skills is valued and required of students when completing an undergraduate degree program at ESU. Practice in developing critical thinking skills occurs across the disciplines as a result of assignments, exercises, and lab experiences embedded in the general education curriculum. In addition, these skills are enhanced through the discipline specific curriculum for the students' major program of study. Assessing critical thinking skill development as a part of the general education program course specific curriculum was the focus of this project.

PURPOSE of the ASSESSMENTS

Establishing a routine assessment practice which measures students' development of critical thinking skills as it occurs across the general education program curriculum is essential. Critical thinking skills are learned and honed as a student navigates the multidisciplinary approaches to thinking critically about the world and its complex contexts. Thus, these skills develop over time. Improving student learning is the driving force for the implementation of the assessments while the results and findings are shared transparently with the campus community and are available to interested parties on the Office of Institutional Research and Assessment website.

METHOD

A critical thinking assessment task force consisting of the Assistant Provost for Institutional Research and Assessment, the Director of General Education, and the Director of English Composition convened to design and operationalize a critical thinking assessment strategy for general education courses. The trio met consistently during the fall 2014 semester to operationalize the plan to engage discipline specific faculty in the assessment of student work samples from general education courses aligned with developing students' critical thinking skills.

In the spring of 2014, general education faculty mapped their courses to the six general education program goals. There were 21 unique courses and 22 individual faculty who self-identified through the curriculum mapping exercise as having curriculum dedicated to the development of students' critical thinking skills. The disciplines identified were Business, Mathematics, English, Psychology, Political Science, Information Technology, History,

Economics, Health Education, Music, and Art. It was from these results that four individual courses from four distinct disciplines were identified for use in the first three-year cycle of the assessment of course embedded critical thinking skills. In spring 2015, student assignments from History (HI101), Biology (GB100), and Business (BU293) were assessed. In spring 2016, Biology (GB100) and Business (BU293) served as the assessment courses, and in spring 2017, Psychology (PY100) was assessed.

A long-term goal is to cyclically assess students' learning of critical thinking skills for all disciplines and courses mapped to the critical thinking general education goal. The formative benefit is the capacity to use assessment data to improve course level student learning and collectively to inform the General Education Council on the strengths and weaknesses of critical thinking skill development across the general education curriculum. Since learning critical thinking skills is a process occurring over time, it is believed that the assessment findings will inform change strategies that advance student learning of critical thinking skills.

The instrument used for assessing student work samples was the AAC&U VALUE Rubric for Critical Thinking Assessment (Appendix G). As a part of the curriculum mapping exercise, faculty members were introduced to the AAC&U VALUE Rubrics as a potential tool to use when assessing general education goals embedded within their courses. Faculty teaching critical thinking skills were asked to review the AAC&U critical thinking value rubric and make a determination whether the rubric was fitting as an evaluation tool for assignments from their courses. Upon reviewing the assignment prompts, faculty in the disciplines acknowledged that using the AAC&U Critical Thinking Value Rubric was an appropriate instrument to use for assessing student skills. It was from these disciplines that the initial courses were selected for assessment. The courses were World Cultures (HI101), Business Ethics (BU293), General Biology (GB101), and Introductory Psychology (PY100).

In 2015, the student assignments were randomly selected from each respective course to generate a total sample of 90 student assignments with 30 from each discipline, respectively. In 2016, the same sampling technique was used and a total of 89 student assignments were scored. In the 2017 assessment, the Psychology faculty randomly sampled student assignments from multiple sections. Faculty also provided assignment prompts for each sample group. The student assignments were blinded and converted into electronic pdf documents for distribution to the respective faculty for scoring. These sample sizes were deemed fitting based upon the number of students enrolled in each course and to match the assessment criteria for having each student work evaluated twice by a different faculty evaluator.

The faculty evaluators met as a group to review the rubric and perform calibration exercises prior to the official evaluation of the student assignments. During the calibration session, it was acknowledged that the levels and dimensions should be evaluated based upon the level of course curriculum (lower level general education courses) and student experience (first or second year college students). It was also acknowledged that the AAC&U value rubric was designed to be used in a variety of educational contexts and levels and that the calibration session was to serve as a way to normalize the rubrics for our use. During the 2015 calibration session, it was also recognized that one of the two assignment prompts for the Business Ethics course wasn't valid for use in the assessments. Thus, the student work samples from Business were

pared down to 20 and the faculty evaluators were reduced from three to two, resulting in the total sample for all student assignments across the three disciplines equaling 80 instead of the planned 90. Each evaluator scored 20 assignments each, with each student work being evaluated twice for inter-rater reliability. In 2017, the Psychology faculty scored a total of 105 student assignments that were evaluated using the AAC&U Critical Thinking Value Rubric accordingly.

RESULTS

The AAC&U VALUE Rubric dimensions for Critical Thinking are: Explanation of Issues, Evidence, Influence of Context and Assumptions, Student's Position, and Conclusions. The levels consisted of a four point rating scale represented by Benchmark (1), Milestone (2), Milestone (3), and Capstone (4). The descriptions of the dimensions and level scale ratings are shown in Appendix G.

Rubric Summary

The Rubric Summary (Appendix A) shows the mean scores by dimension for each discipline assessed and also includes the combined overall scores. For 2015, the overall results of the Rubric Summary (Appendix A) showed that the means ranged from M = 1.99 to *M* = 2.13 on a 4 point scale and standard deviations ranged from *SD* = .83 to *SD* = .87. The dimension with the overall lowest mean score was Conclusions and Related Outcomes (*M* = 1.99, *SD* = .85*)* and the dimension with the overall highest mean score was Evidence (*M* = 2.13, *SD* = 2.13). For the Biology discipline, the Influence of Context and Assumptions dimension had the lowest mean at (*M* = 1.67, *SD* = .82). For History, the Explanation of Issues dimension mean was lowest (*M* = 1.82, *SD* = .83), and for Business, the Conclusions and Related Outcomes dimension had the lowest mean (*M* = 2.08, *SD* = .62).

The overall results of the Rubric Summary for 2016 (Appendix A) showed means ranging from *M* = 1.89 to M = 2.14 on a 4 point scale and standard deviations ranged from *SD* = .63 to *SD* = .73. The dimension with the overall lowest mean score was Evidence (*M* = 1.89, *SD* = .73) and the dimension with the highest mean was Explanation of Issues (*M* = 2.14, *SD* = .71). For the Biology discipline, the lowest mean was for the Conclusions and Related Outcomes dimension (*M* = 1.84, *SD* = .63) and the highest mean was for Explanation of Issues (*M* = 2.19, *SD* = .87).

In 2017, the overall results for the Psychology Rubric Summary (Appendix A) showed a total rubric mean score of *M* = 3.42 on a 4 point scale. The mean scores ranged from *M* = 3.14 (Conclusions and Related Outcomes) to *M* = 3.74 (Explanation of Issues), while standard deviations ranged from *SD* = .57 (Explanation of Issues) to *SD* = .90 (Student's Position).

In comparing the overall rubric results from all three years, the 2017 (Psychology 100 course) overall assessment results rubric mean score (*M* = 3.42) was higher compared to previous years scores, while the lowest total rubric mean score occurred in the 2016 report *(M* = 2.02*)*, with the 2015 total rubric mean score (*M* = 2.05) only slightly higher.

Explanation of Issues

The Explanation of Issues dimension (Appendix B) showed that in 2015, 69% of the assignments scored at the Benchmark (1) or Milestone (2) levels, while 28% scored at Milestone (3) and 3% at the Capstone (4) levels. The mean was M = 2.01, and the standard deviation was less than 1 (*SD* = .87), the standard error was *SE* = .07 and the 95% confidence interval was CI = 1.87 and 2.14. For the Business student assignments, 45% were scored at the Milestone (3) level and these assignments had the highest mean score of *M* = 2.45 (*SD* = .60). History student assignments scored at the lowest mean for this dimension (*M* = 1.82; *SD* = .83). In the 2015 results, 72% of the assignments scored at the Benchmark (1) or Milestone (2) levels, while 26% scored at the Milestone (3) level and 2% scored at the Capstone (4) level. In 2016, both the Biology and Business assignments scored closely on mean scores (*M* = 2.19 and *M* = 2.10), respectively. Interestingly, the 2017 results (Psychology 100 assignments) showed that 7% scored at the Milestone (2) level, 12% scored at the Milestone (3) level, and 81% scored at the Capstone (4) level.

Evidence

The Evidence dimension (Appendix C) showed that in 2015, 68% of the assignments scored at the Benchmark (1) or Milestone (2) levels, while 28% scored at the Milestone (3) and 4% at the Capstone (4) levels. The mean was *M* = 2.13 and the standard deviation was *SD* = .83. The standard error was *SE* = .07 and the 95% confidence interval was CI = 2.00 – 2.25. History student assignments scored the highest for this dimension with 32% at the Milestone (3) and 10% at the Capstone (4) level, with a mean score of *M* = 2.27 and a standard deviation of *SD* = .95. Biology student assignments scored the lowest (*M* = 1.93, *SD* = .80). In 2016, overall 79% of the assignments were scored in the Benchmark (1) or Milestone (2) levels, while 21% were scored at the Milestone (3) levels, none of the assignments were scored at the Capstone (4) level. The Evidence dimension mean score was *M* = 1.89 with a standard deviation of *SD* = .73. Biology student assignments had the higher mean score (*M* = 2.13), while the Business student assignment mean score was *M* = 1.76. In 2017, the Evidence dimension mean score was *M* = 3.56 with a standard deviation of *SD* = .059 and a standard error of *SE* = .06. The Capstone (4) level accounted for 61% of the scores with 31% scored at Milestone (3). Five percent scored at the Milestone (2) level and no assignments were scored at the Benchmark (1) level for the Evidence dimension.

Influence of Context and Assumptions

The Influence of Context and Assumptions dimension (Appendix D) showed in 2015 that 72% of the assignments scored at the Benchmark (1) or Milestone (2) levels, while 34% scored at the Milestone (3) and 4% at the Capstone (4) levels. The Influence of Context and Assumptions mean score was *M* = 2.0 and the standard deviation was *SD* = .84. The standard error was *SE* = .07 and the 95% confidence interval was CI = 1.87 – 2.13. In 2016, 79% scored in the Benchmark (1) and Milestone (2) levels, 19% in the Milestone (3) level and only 1% at the Capstone (4) level. The standard deviation was *SD* = .71 and the standard error was *SE* = .08. The 95% confidence interval was CI = 1.98 – 2.23. For 2017, 11% scored at the Benchmark (1) and Milestone (2) levels, while 30% (Milestone 3) and 60% (Capstone 4) scored at the upper levels. The mean score for the dimension was *M* = 3.47, the standard deviation was *SD* = .75, the standard error was *SE* = .07, while the 95% confidence interval was CI = 3.32 – 3.61. In 2015, the (Biology) assignment mean score of 1.67 (*SD* = *.82*) represents the lowest score in this

dimension, while the 2017 Psychology assignment mean score was the highest at *M* = 3.47.

Student's Position

The Student's Position dimension (Appendix E) showed in 2015 that 68% of the assignments scored at the Benchmark (1) or Milestone (2) levels, while 28% scored at the Milestone (3) and 4% at the Capstone (4) levels. The mean score was *M* = 2.1 and the standard deviation was *SD* = .85. The standard error was *SE* = .07 and the 95% confidence interval was CI = 1.97 – 2.23. The Business student assignments were scored highest (*M* = 2.55) on this dimension with 50% receiving Milestone (3) or Capstone (4) ratings, meanwhile 19% of Biology (*M* = 1.82) student assignments scored at these same levels. For the 2016 assessments, 73% scored at the Benchmark (1) and Milestone (2) levels and 26% scored at the Milestone (3) level, only 1% scored at the Capstone (4) level. The mean score was *M* = 2.1 and the standard deviation was *SD* = .70. The standard error was *SE* = .07 and the 95% confidence interval was CI = 1.94 – 2.23. The Biology assignments had the lowest mean score at *M* = 1.87 and the Business assignment mean score was *M* = 2.21. In 2017, 16% of assignments scored at the Benchmark (1) and Milestone (2) levels, 42% scored at the Milestone (3) level, and 43% scored at the Capstone (4) level. The mean score for the dimension was *M* = 3.19, the standard deviation was *SD* = .90, the standard error was *SE* = .09, and the 95% confidence interval was CI = 3.02 – 3.36.

Conclusions and Related Outcomes

The Conclusions and Related Outcomes dimension (Appendix F) showed in 2015 that overall 74% of the assignments scored at the Benchmark (1) or Milestone (2) levels, while 22% scored at the Milestone (3) and 5% at the Capstone (4) levels. The mean was *M* = 1.99 and the standard deviation was *SD* = .87. The standard error was *SE* = .07 and the 95% confidence interval was CI = 1.86 – 2.13. The History and Business assignments were scored the highest on this dimension (*M* = 2.08) with 35% scored at the Capstone (4) or Milestone (3) levels respectively, while Biology (*M* = 1.85) assignments had lower scores (3% and 18%) in these same categories. In 2016, the overall mean score for the Conclusions and Related Outcomes Dimension was *M* = 1.99, the standard deviation was *SD* = .61, the standard error was *SE* = .07, and the 95% confidence interval was CI = 1.86 – 1.12. Eighty-three percent of the assignments were scored in the Benchmark (1) and Milestone (2) levels, while 16% were scored at the Milestone (3) level and 1% scored at the Capstone (4) level. For 2017, the mean score for the dimension was *M* = 3.14, the standard deviation was *SD* = .89, and the standard error was *SE* = .09. The 95 % confidence interval was CI = .297 – 3.31. A total of 20% of the assignments were scored at the Benchmark (1) and Milestone (2) levels, while 39% were scored at the Milestone (3) level and 41% scored at the Capstone (4) level.

RECOMMENDATIONS AND NEXT STEPS

The information contained in this report is to be shared with multiple internal constituents including the General Education Council, with those faculty whose student assignments were scored, and in the aggregate with other faculty teaching general education courses with embedded critical thinking skills. It is hoped that by sharing this report the interest in assessing and improving student learning of critical thinking skills will increase.

The findings in this report provide evidence of student learning of critical thinking skills for the specific course assignments being assessed. These data are deemed valuable for informing student learning improvement strategies in the specific courses for the disciplines participating in the assessment project. There was some noted discipline specific variability in the mean scores and percentages of students scoring in the performance levels (Benchmark, Milestone, and Capstone), thus identifying opportunities for improvement and further study within the disciplines. However these findings are not considered generalizable to other courses or representative of the student learning for the overall general education program as the number of courses assessed in the grand scheme of things was small. Rather it is recommended to adopt a continuous cycle of critical thinking skills assessment practices by integrating all courses that teach critical thinking skills into the assessment cycle over time. The comparison of mean scores across disciplines is not recommended as the assignment prompts differed in tasks and rigor.

Continuing to use the AAC&U Value Rubric for Critical Thinking as the tool for scoring student assignments is recommended. One of the benefits of using the AAC&U VALUE Rubric for Critical Thinking Assessment is the ability to rate student assignments across multiple disciplines and multiple years using a common rubric. This first three-year iteration of critical thinking assessments has defined the baselines for the rubric dimensions for each specific discipline, as well as identified those target assignments that are good matches for the rubric evaluations. Overall, the ratings data were typical of introductory level coursework and first-to-second year student performance. However, it is noted that the overall rubric and individual dimension mean scores for the 2017 Psychology discipline assessments were notably higher than the scores from the 2015 and 2016 assessments with History, Business, and Biology as the disciplines of study. It is believed that this is the result of the psychology faculty designing their assignment prompt to align with the dimension descriptions of the critical thinking value rubric. The discipline specific courses assessed in the first two years of the assessment cycle weren't afforded this opportunity and used assignment prompts that were as closely aligned with the rubric as possible.

Student development of critical thinking skills is achieved over the duration of the undergraduate educational experience and are considered a part of the general education program curriculum. It is noted that refined critical thinking skills specific to the major field of study are considered an important part of learning as well. In as such, measuring critical thinking skills isn't a typical strategy employed in most courses where content knowledge and discipline specific skills are prioritized. In fact, there isn't a specific course within the general education program that is dedicated to the concepts of critical thinking; rather learning and demonstrating critical thinking skills is integrated into learning experiences and assignments which demonstrate

learning in a variety of content knowledge and practical application competencies.

The next iteration of critical thinking skills assessments will occur when the annual General Education Assessment Team (GEAT) project is assigned to General Education (GE) Goal 5. The timing of this GEAT assessment task has yet to be determined as of the writing of this report. It is believed that an appropriate task for GE Goal 5 GEAT charge is to scan the external higher education environment to determine if critical thinking skills should be considered as one of the objective components of the General Education Program Goal 1: Core Skills. Common to written communication, oral communication, quantitative and analytical reasoning, and information technology and literacy, the student learning of these foundational skills occurs as an outcome of the holistic educational experience, not dedicated curriculum in one or two courses. Thus, changing the goal strategy from a stand-alone goal to one defined as a function of learned core skills makes sense.

The reporting of these assessment findings to stakeholders is ongoing and transparent. The entities receiving this report include the Council on General Education, the Director of General Education, the academic departments, the deans, the faculty, and the administration. The report is available for download from the Office of Institutional Research and Assessment website and is used as an evidence document for the Higher Learning Commission's interests in general education program assessment practices.

APPENDICES

APPENDIX A

Spring 2015 Results

Rubric Summary	Biology n=60	Std. Dev	History n=60	Std. Dev	Business n=40	Std. Dev	Overall n=160	Std. Dev
Explanation of Issues	1.88	0.94	**1.82**	0.83	2.48	0.60	2.01	0.87
Evidence	1.93	0.80	2.27	0.95	2.20	0.61	**2.13**	0.83
Influence of Context and Assumptions	**1.67**	0.82	2.18	0.91	2.23	0.58	2.00	0.84
Student's Position (perspective, thesis/hypothesis)	1.82	0.77	2.08	0.94	2.55	0.60	2.10	0.85
Conclusions and Related Outcomes (implications and consequences)	1.85	0.84	2.08	1.01	**2.08**	0.62	**1.99**	0.87
Total	**1.83**	**0.83**	**2.09**	**0.94**	**2.31**	**0.62**	**2.05**	**0.85**

Spring 2016 Results

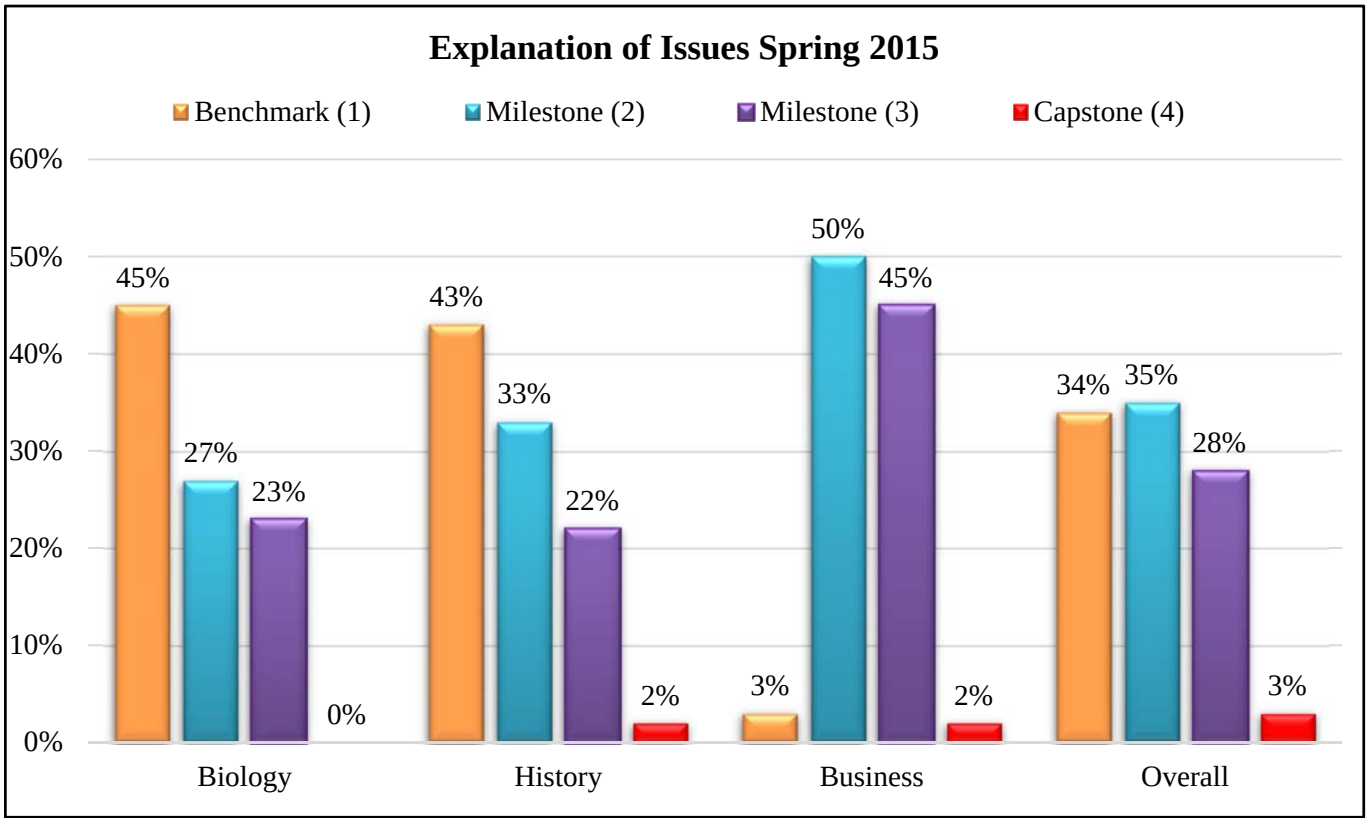
Rubric Summary	Biology n=31	Std. Dev	Business n=58	Std. Dev	Overall n=89	Std. Dev
Explanation of Issues	2.19	0.87	2.10	0.61	2.14	0.71
Evidence	2.13	0.72	**1.76**	0.71	**1.89**	0.73
Influence of Context and Assumptions	2.10	0.54	1.95	0.74	2.00	0.67
Student's Position (perspective, thesis/hypothesis)	1.87	0.76	2.21	0.64	2.09	0.70
Conclusions and Related Outcomes (implications and consequences)	**1.84**	0.82	2.07	0.49	1.99	0.63
Total	**2.03**	**0.74**	**2.02**	**0.64**	**2.02**	**0.69**

Spring 2017 Results

Rubric Summary	Psychology n=105	Std. Dev
Explanation of Issues	3.74	0.57
Evidence	3.56	0.59
Influence of Context and Assumptions	3.47	0.76
Student's Position (perspective, thesis/hypothesis)	3.19	0.90
Conclusions and Related Outcomes (implications and consequences)	**3.14**	0.89
Total	**3.42**	**0.55**

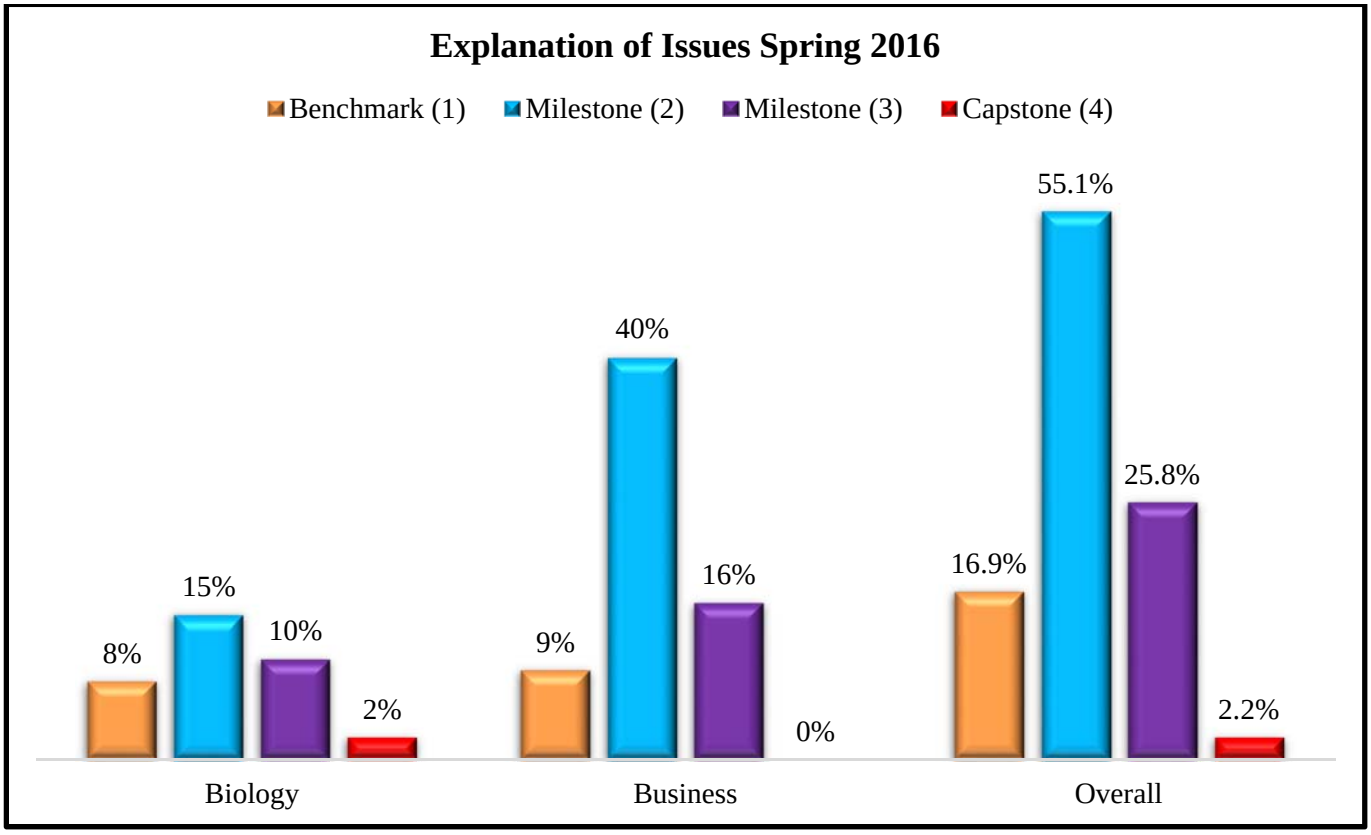
APPENDIX B
Spring 2015

Explanation of Issues	Biology	History	Business	Overall
Benchmark (1)	45%	43%	3%	34%
Milestone (2)	27%	33%	50%	35%
Milestone (3)	23%	22%	45%	28%
Capstone (4)	0%	2%	2%	3%
Mean	1.88	1.82	2.48	2.01
Standard Deviation	0.94	0.83	0.60	0.87
Standard Error	0.12	0.11	0.09	0.07
Confidence Interval @95%	1.65 - 2.12	1.61 - 2.03	2.29 - 2.66	1.87 - 2.14



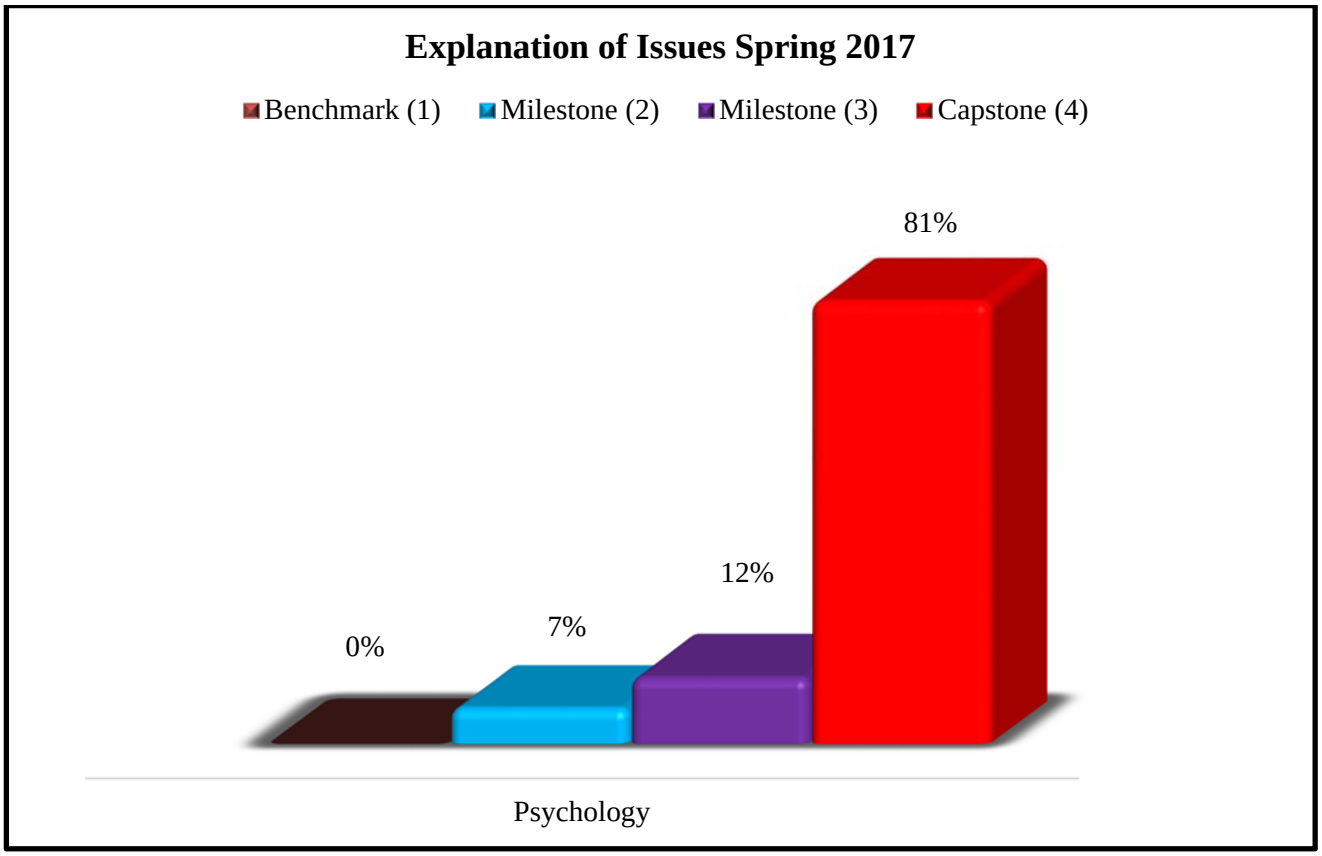
Spring 2016

Explanation of Issues	Biology	Business	Overall
Benchmark (1)	8%	9%	17%
Milestone (2)	15%	40%	55%
Milestone (3)	10%	16%	26%
Capstone (4)	2%	0%	2%
Mean	2.19	2.1	2.13
Standard Deviation	0.87	0.61	0.71
Standard Error	0.16	0.08	0.08
Confidence Interval @95%	1.833 - 2.497	1.942 - 2.258	1.982 - 2.278



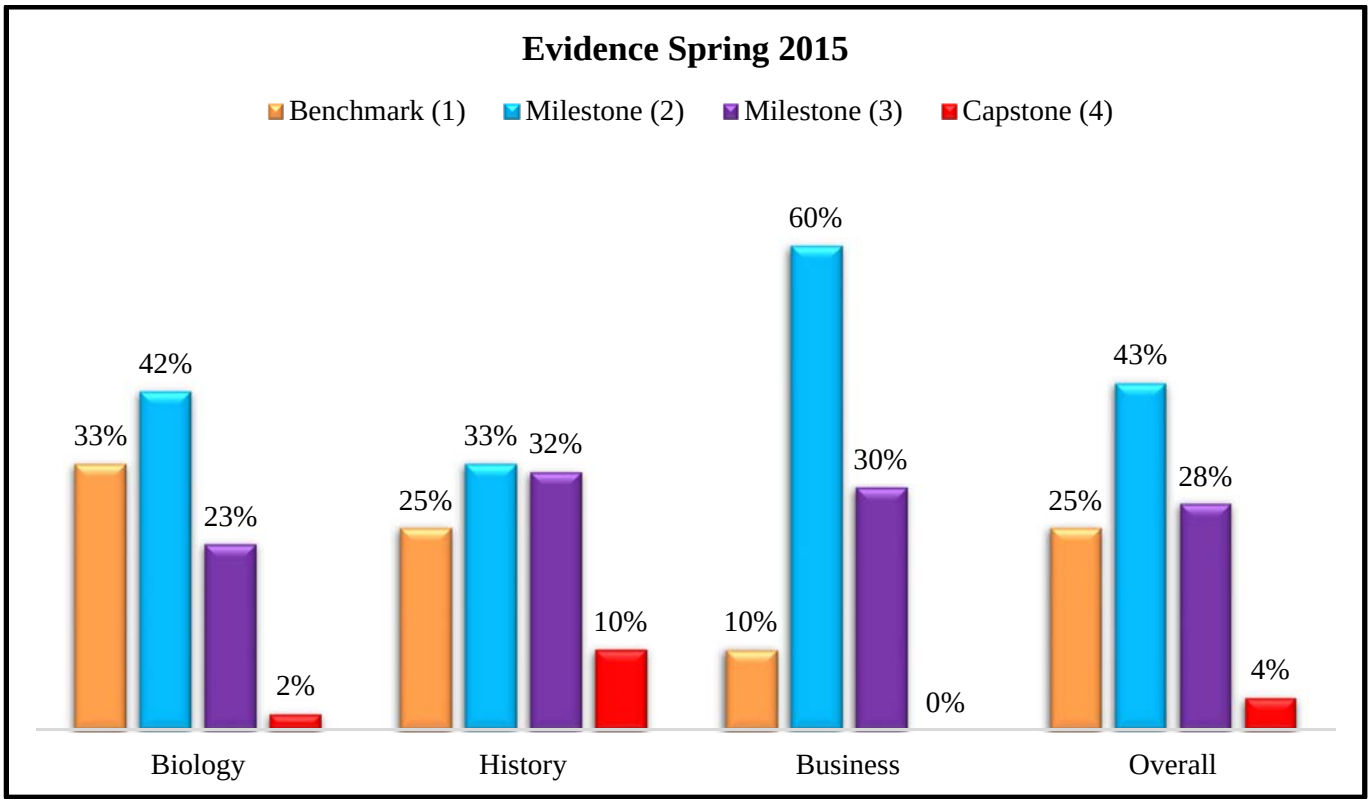
Spring 2017

Explanation of Issues	Psychology
Benchmark (1)	0
Milestone (2)	7%
Milestone (3)	12%
Capstone (4)	81%
Mean	3.74
Standard Deviation	0.57
Standard Error	0.06
Confidence Interval @95%	3.63 - 3.47



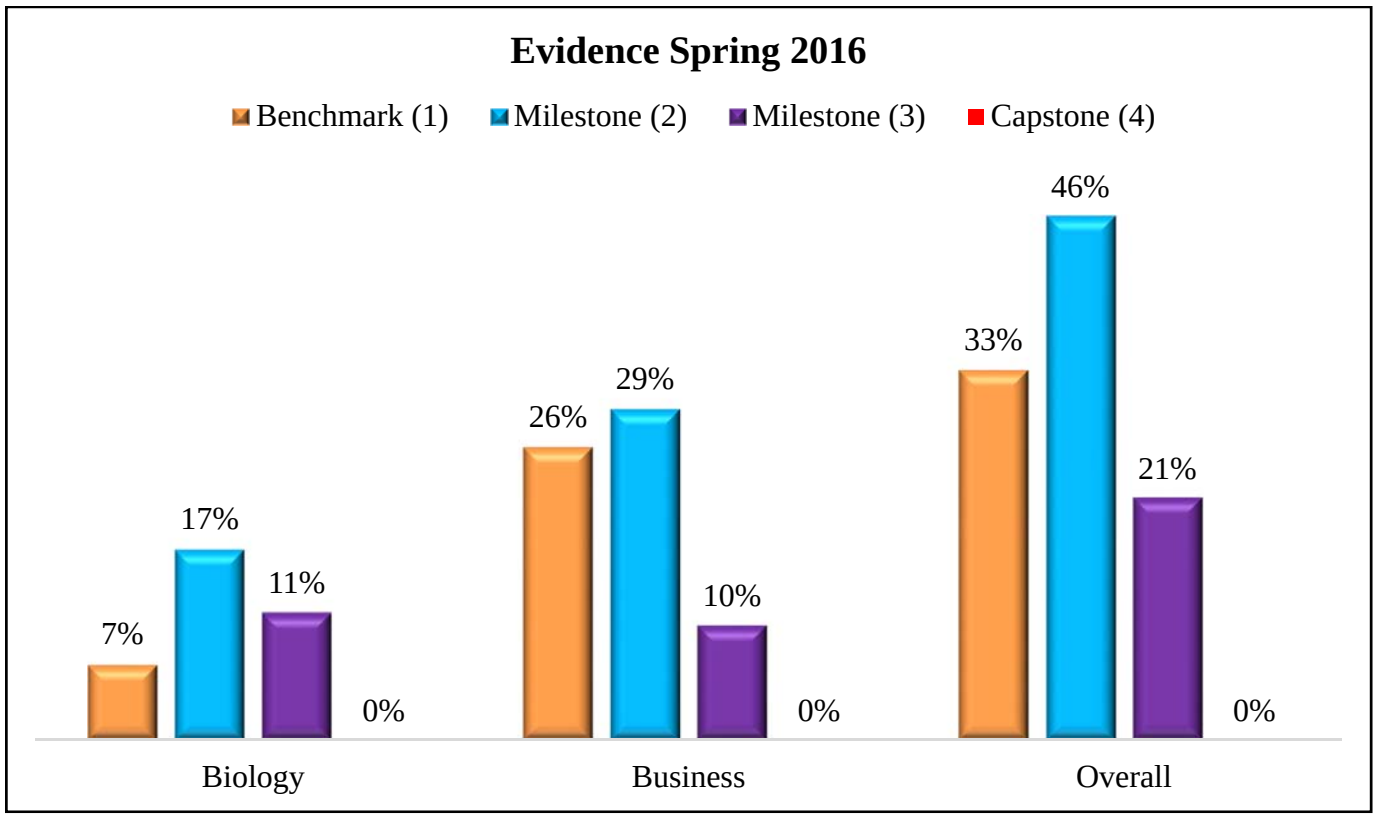
APPENDIX C
Spring 2015

Evidence	Biology	History	Business	Overall
Benchmark (1)	33%	25%	10%	25%
Milestone (2)	42%	33%	60%	43%
Milestone (3)	23%	32%	30%	28%
Capstone (4)	2%	10%	0%	4%
Mean	1.93	2.27	2.2	2.13
Standard Deviation	0.80	0.95	0.61	0.83
Standard Error	0.1	0.12	0.10	0.07
Confidence Interval @95%	1.73 - 2.14	2.03 - 2.51	2.01 - 2.39	2.00 - 2.25



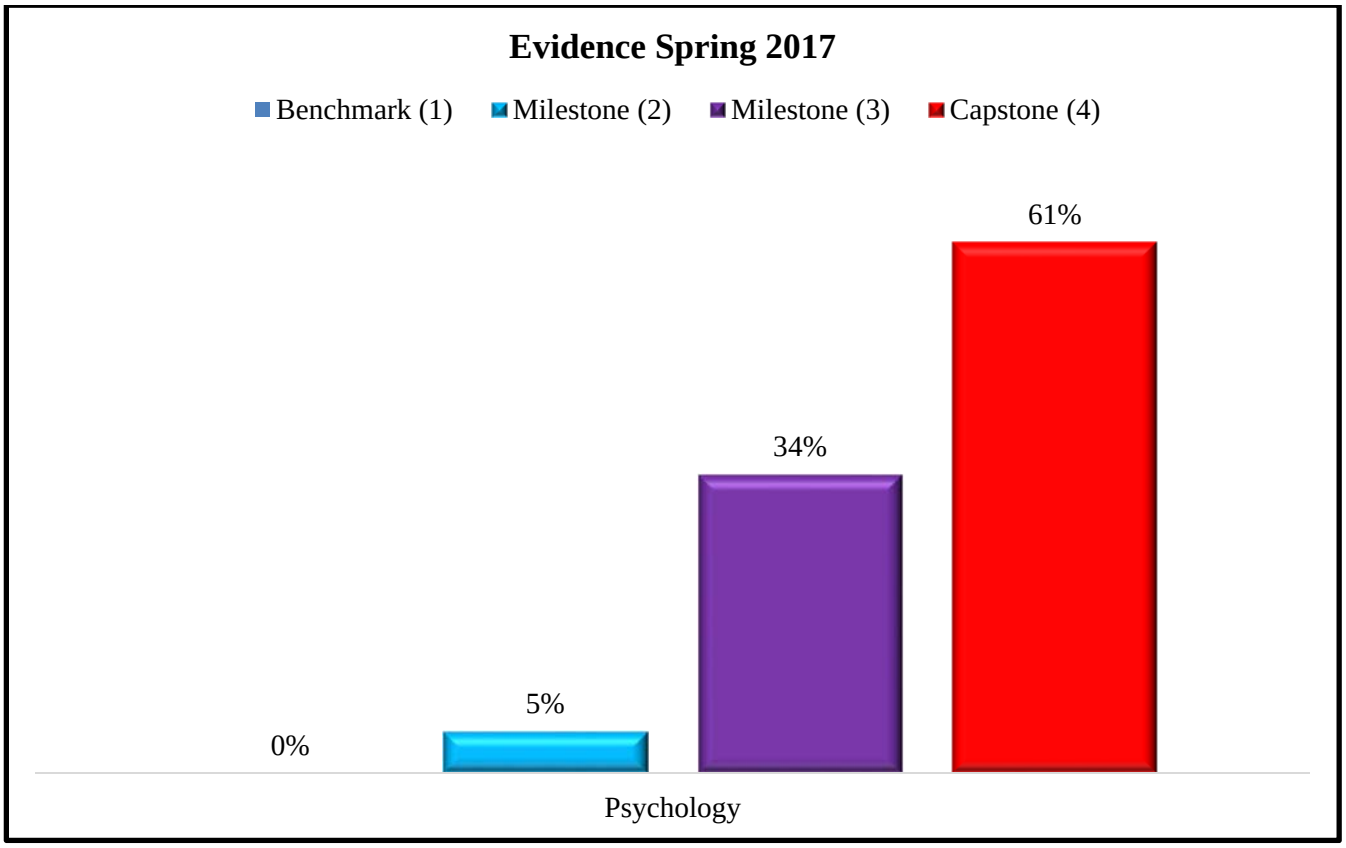
Spring 2016

Evidence	Biology	Business	Overall
Benchmark (1)	7%	26%	33%
Milestone (2)	17%	29%	46%
Milestone (3)	11%	10%	21%
Capstone (4)	0%	0%	0%
Mean	2.13	1.76	1.89
Standard Deviation	0.72	0.71	0.73
Standard Error	0.13	0.09	0.08
Confidence Interval @95%	1.877 - 2.392	1.708 - 2.072	1.738 - 2.042



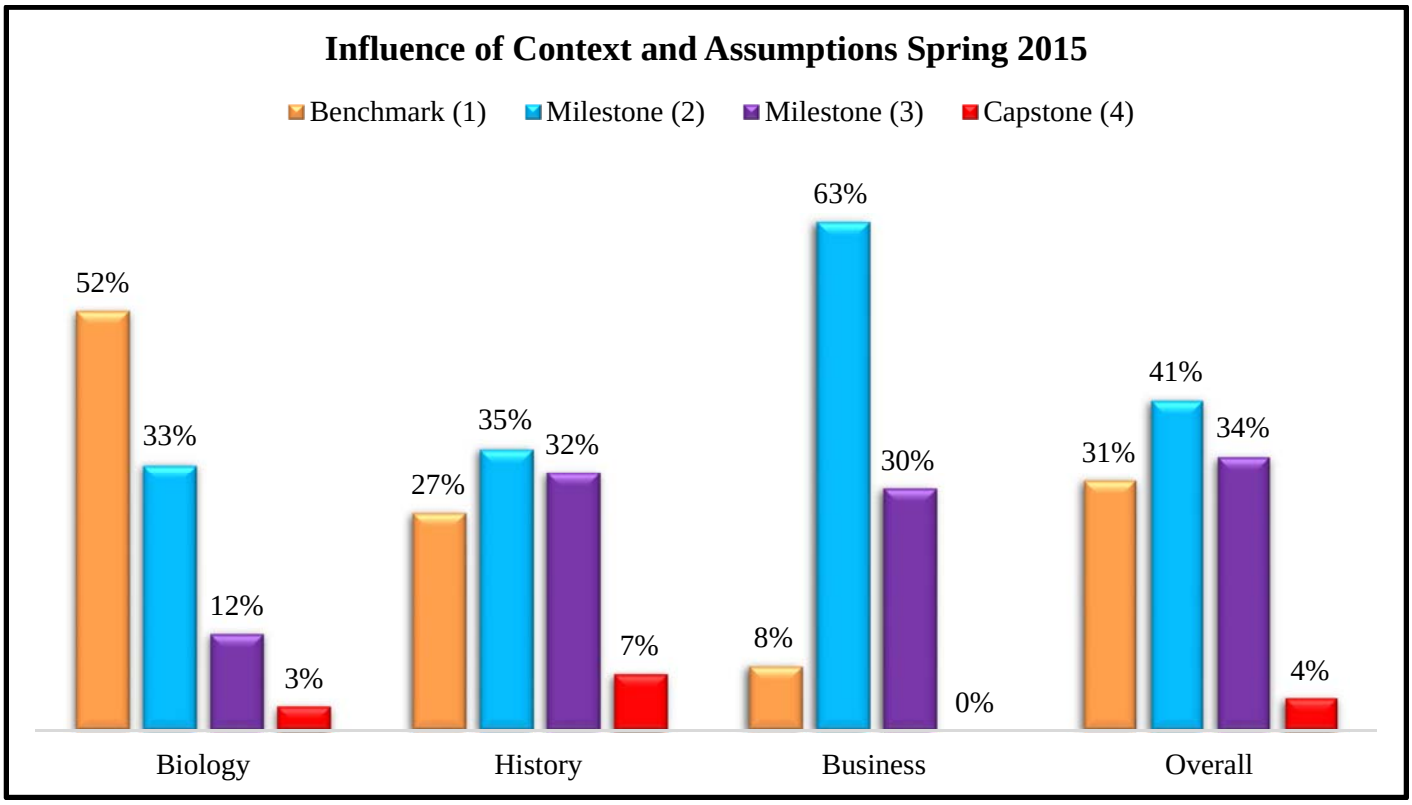
Spring 2017

Evidence	Psychology
Benchmark (1)	0%
Milestone (2)	5%
Milestone (3)	34%
Capstone (4)	61%
Mean	3.56
Standard Deviation	0.59
Standard Error	0.06
Confidence Interval @95%	3.45 - 3.67



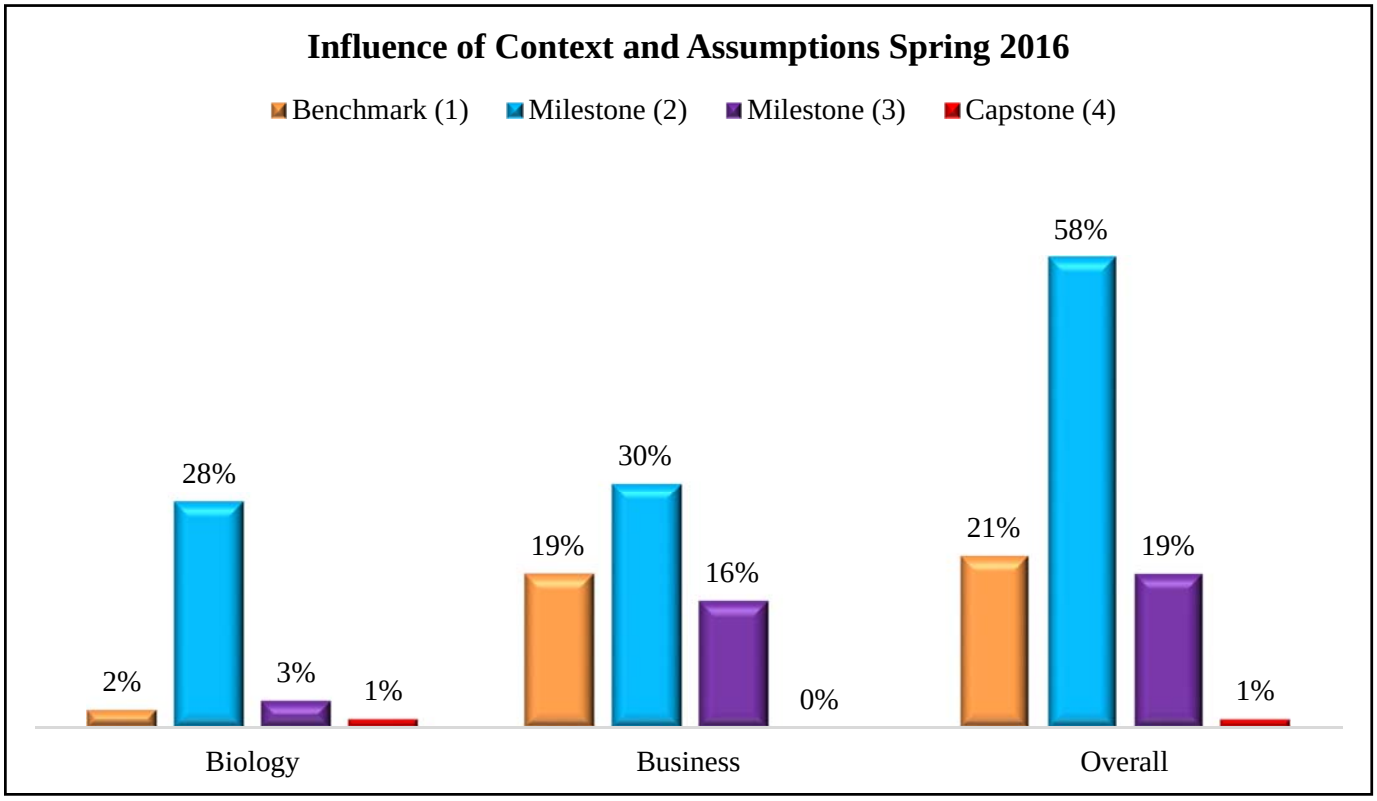
APPENDIX D
Spring 2015

Influence of Context and Assumptions	Biology	History	Business	Overall
Benchmark (1)	52%	27%	8%	31%
Milestone (2)	33%	35%	63%	41%
Milestone (3)	12%	32%	30%	34%
Capstone (4)	3%	7%	0%	4%
Mean	1.67	2.18	2.23	2.00
Standard Deviation	0.82	0.91	0.58	0.84
Standard Error	0.11	0.12	0.09	0.07
Confidence Interval @95%	1.46 - 1.87	1.95 - 2.41	2.05 - 2.40	1.87 - 2.13



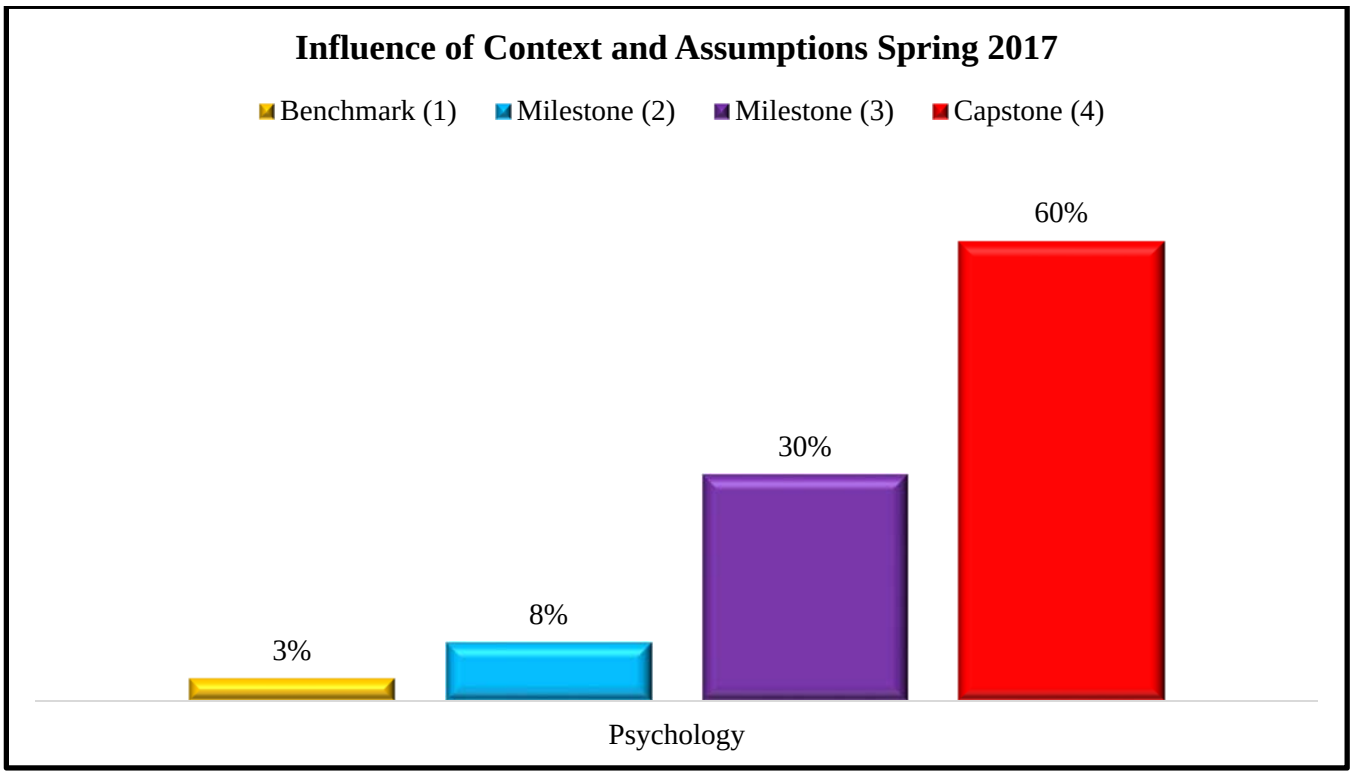
Spring 2016

Influence of Context and Assumptions	Biology	Business	Overall
Benchmark (1)	2%	19%	21%
Milestone (2)	28%	30%	58%
Milestone (3)	3%	16%	19%
Capstone (4)	1%	0%	1%
Mean	2.10	1.95	2.00
Standard Deviation	0.74	0.54	0.67
Standard Error	0.10	0.10	0.07
Confidence Interval @95%	1.910 - 2.299	1.761 - 2.139	1.850 - 2.140



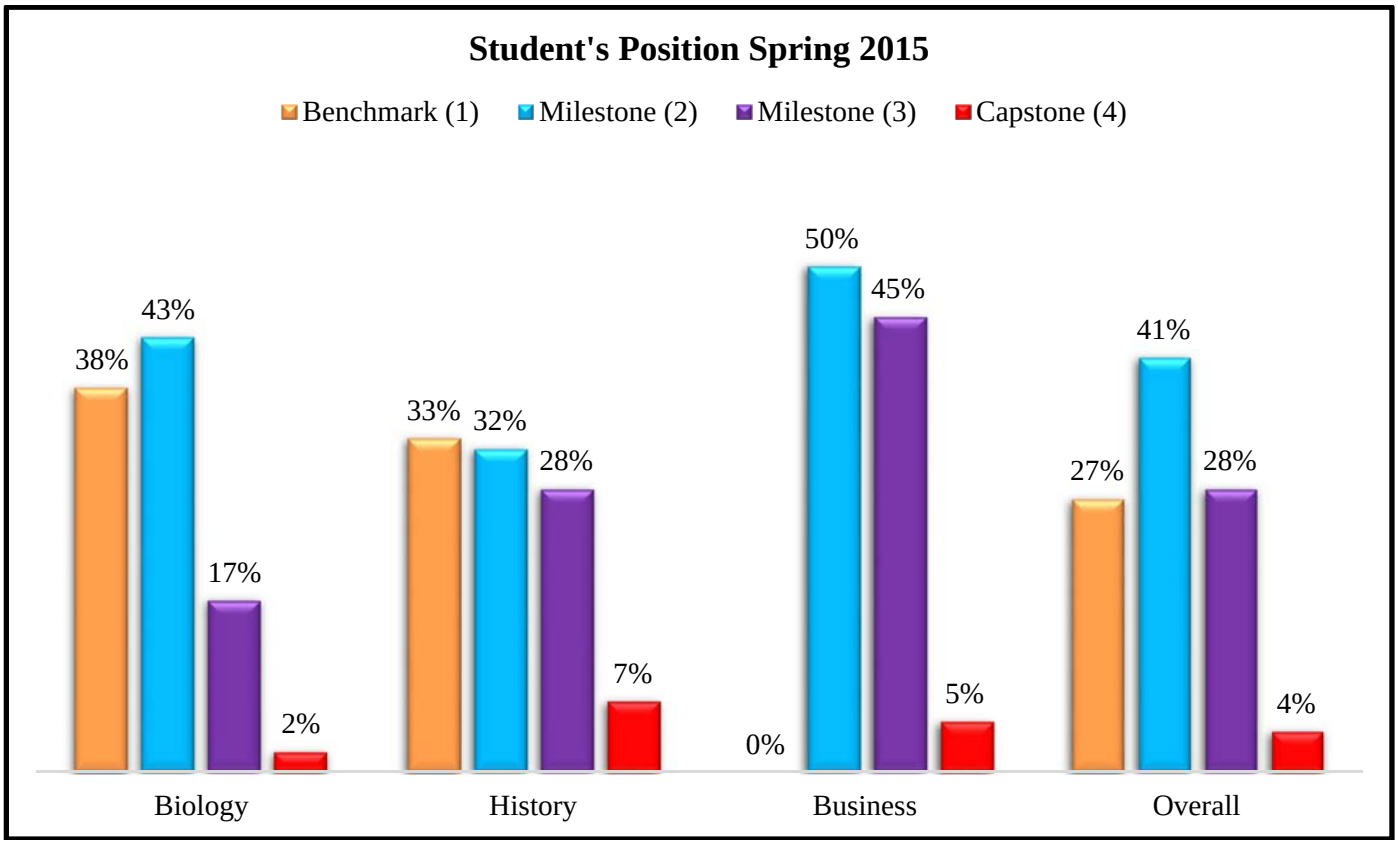
Spring 2017

Influence of Context and Assumptions	Psychology
Benchmark (1)	3%
Milestone (2)	8%
Milestone (3)	30%
Capstone (4)	60%
Mean	3.47
Standard Deviation	0.76
Standard Error	0.07
Confidence Interval @95%	3.32 - 3.61



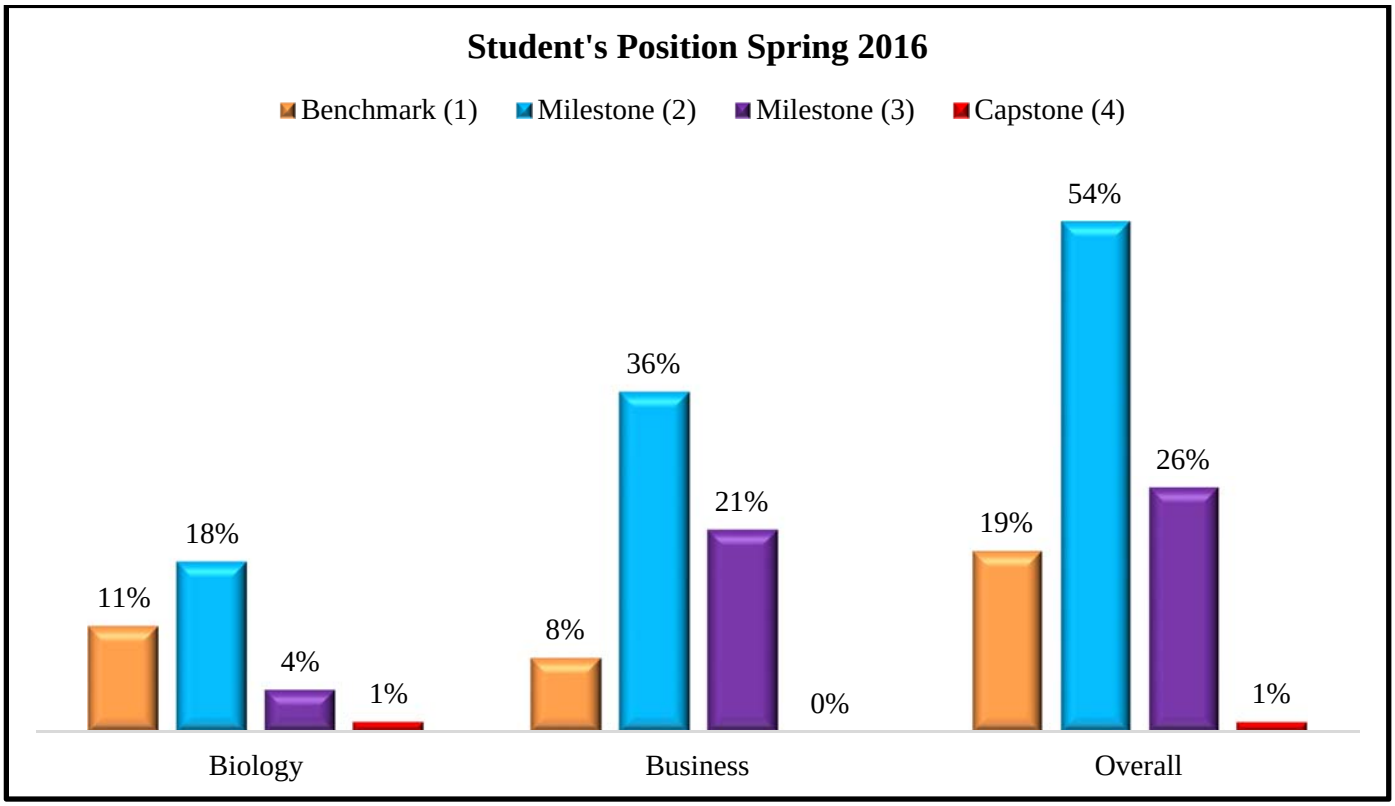
APPENDIX E
Spring 2015

Student's Position (perspective, thesis/hypothesis)	Biology	History	Business	Overall
Benchmark (1)	38%	33%	0%	27%
Milestone (2)	43%	32%	50%	41%
Milestone (3)	17%	28%	45%	28%
Capstone (4)	2%	7%	5%	4%
Mean	1.82	2.08	2.55	2.10
Standard Deviation	0.77	0.94	0.60	0.85
Standard Error	0.10	0.12	0.09	0.07
Confidence Interval @95%	1.62-2.01	1.84-2.32	2.36-2.74	1.97-2.23



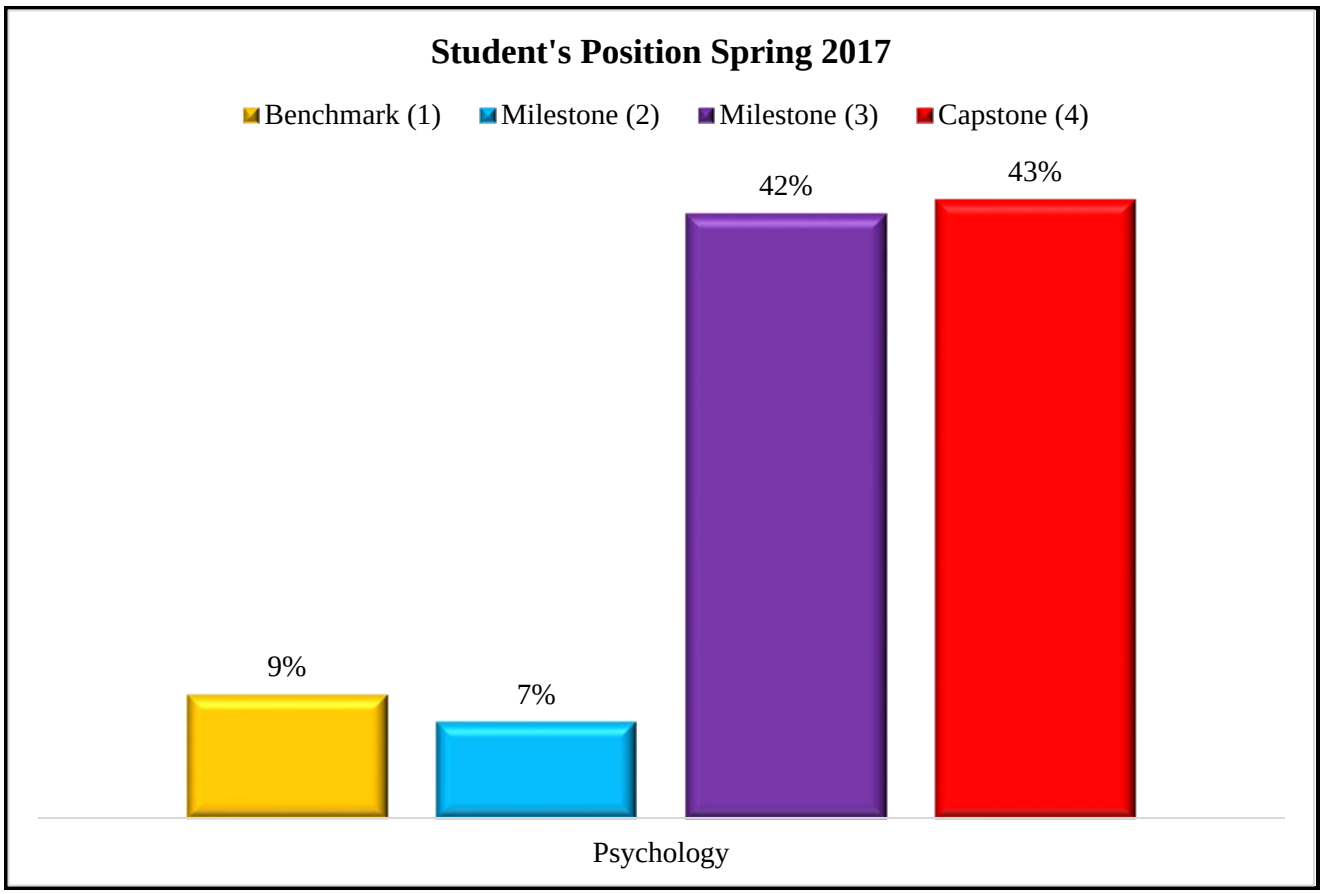
Spring 2016

Student's Position (perspective, thesis/hypothesis)	Biology	Business	Overall
Benchmark (1)	11%	8%	19%
Milestone (2)	18%	36%	54%
Milestone (3)	4%	21%	26%
Capstone (4)	1%	0%	1%
Mean	1.87	2.21	2.1
Standard Deviation	0.76	0.64	0.70
Standard Error	0.14	0.09	0.07
Confidence Interval @95%	1.601 - 2.139	2.045 - 2.375	1.944 - 2.236



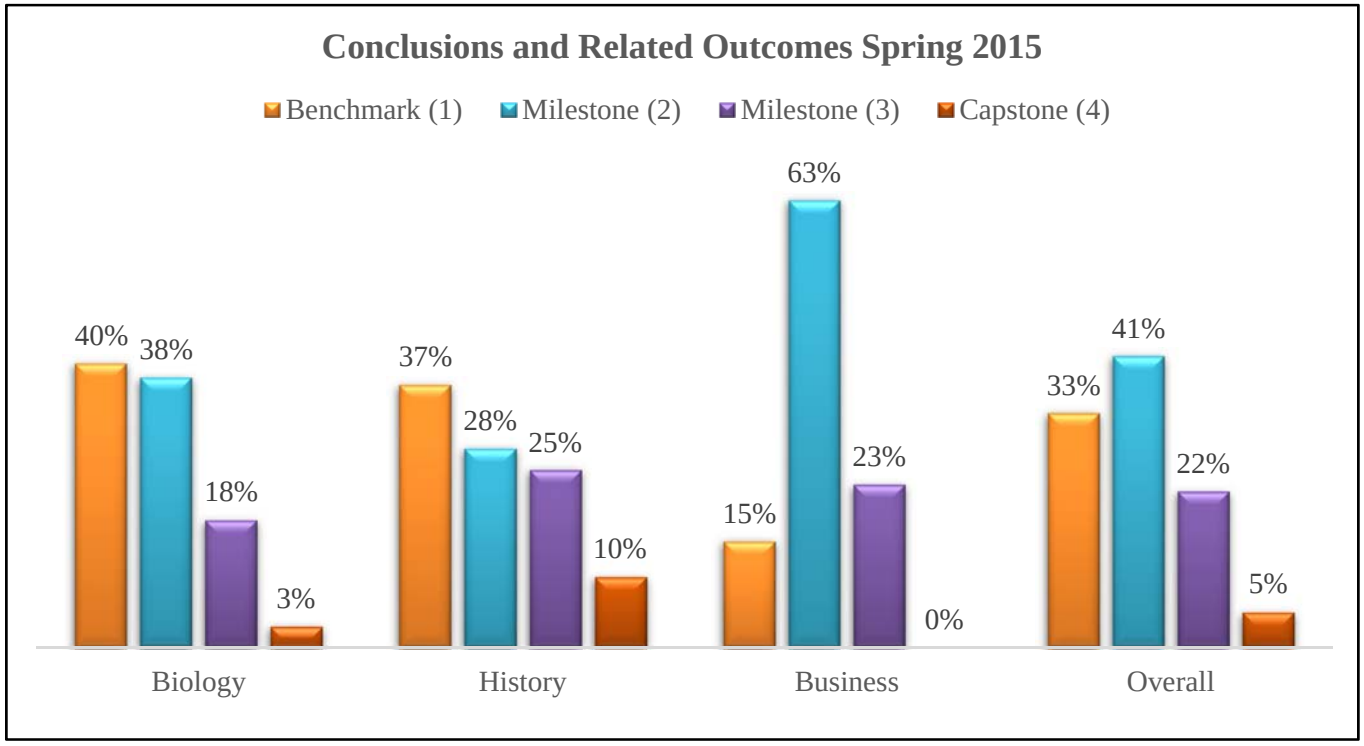
Spring 2017

Student's Position (perspective, thesis/hypothesis)	Psychology
Benchmark (1)	9%
Milestone (2)	7%
Milestone (3)	42%
Capstone (4)	43%
Mean	3.19
Standard Deviation	0.90
Standard Error	0.09
Confidence Interval @95%	3.02 - 3.36

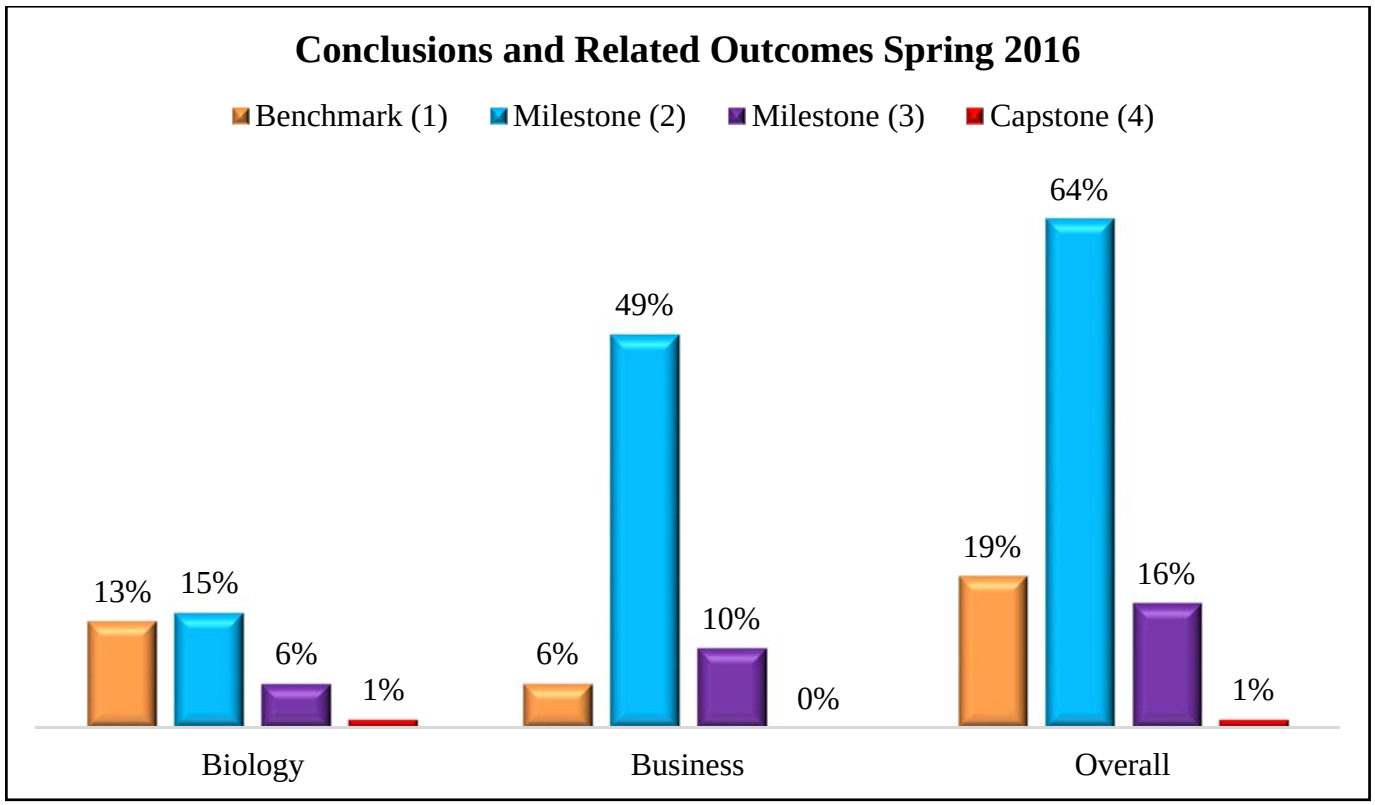


APPENDIX F
Spring 2015

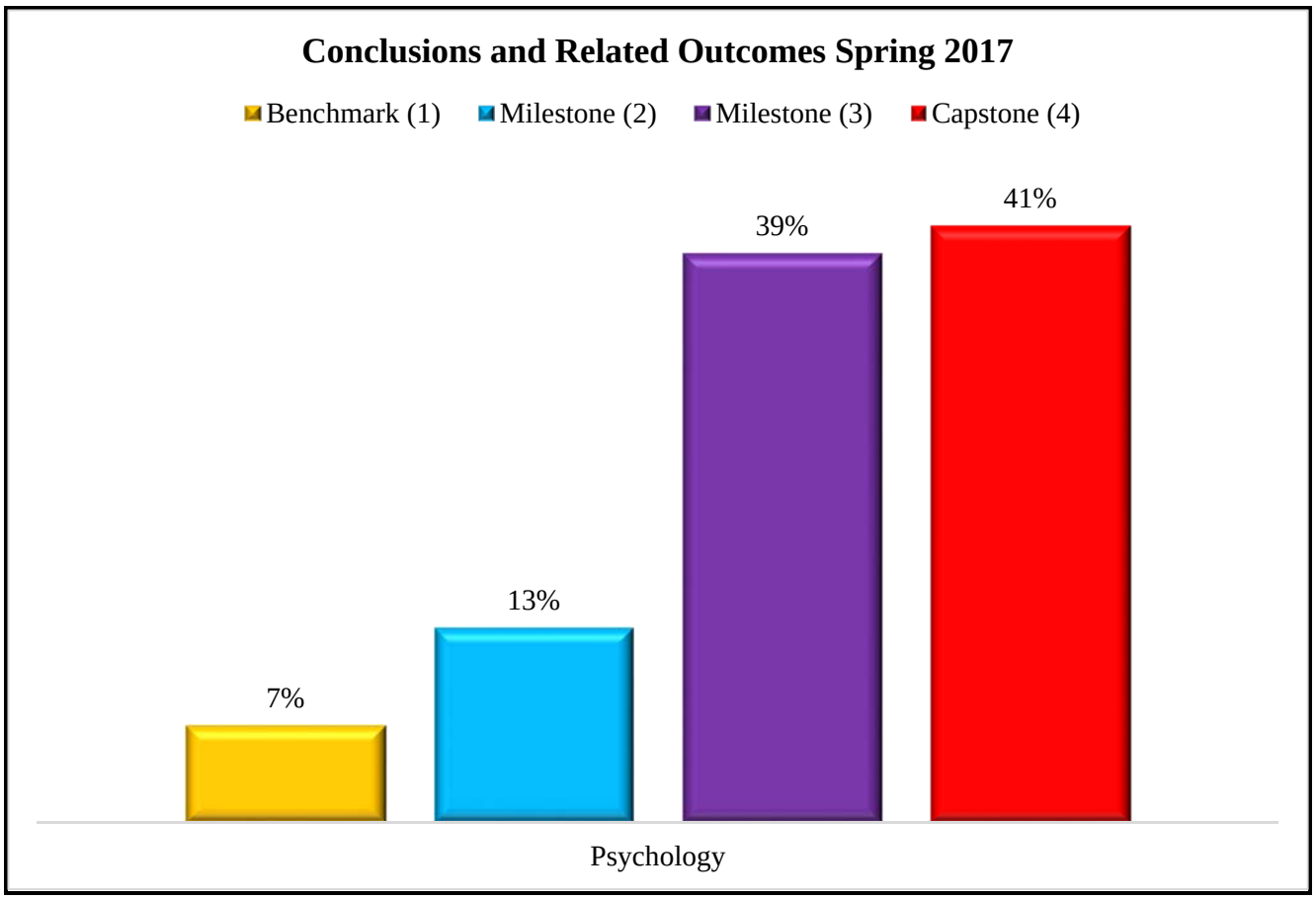
Conclusions and Related Outcomes (implications and consequences)	Biology	History	Business	Overall
Benchmark (1)	40%	37%	15%	33%
Milestone (2)	38%	28%	63%	41%
Milestone (3)	18%	25%	23%	22%
Capstone (4)	3%	10%	0%	5%
Mean	1.85	2.08	2.08	1.99
Standard Deviation	0.84	1.01	0.62	0.87
Standard Error	0.11	0.13	0.10	0.07
Confidence Interval @95%	1.64-2.06	1.83-2.34	1.88-2.27	1.86-2.13



Conclusions and Related Outcomes (implications and consequences)	Biology	Business	Overall
Benchmark (1)	13%	6%	19%
Milestone (2)	15%	49%	64%
Milestone (3)	6%	10%	16%
Capstone (4)	1%	0%	1%
Mean	1.84	2.07	1.99
Standard Deviation	0.82	0.49	0.63
Standard Error	0.15	0.06	0.07
Confidence Interval @95%	1.551 - 2.129	1.944 - 2.196	1.859 - 2.121



Conclusions and Related Outcomes (implications and consequences)	Psychology
Benchmark (1)	7%
Milestone (2)	13%
Milestone (3)	39%
Capstone (4)	41%
Mean	3.14
Standard Deviation	0.89
Standard Error	0.09
Confidence Interval @95%	2.97 - 3.31



APPENDIX G

AAC&U Critical Thinking VALUE Rubric
(This is a reproduction: for more information, please contact value@aacu.org)

The VALUE rubrics were developed by teams of faculty experts representing colleges and universities across the United States through a process that examined many existing campus rubrics and related documents for each learning outcome and incorporated additional feedback from faculty. The rubrics articulate fundamental criteria for each learning outcome, with performance descriptors Demonstrating progressively more sophisticated levels of attainment. The rubrics are intended for institutional-level use in evaluating and discussing student learning, not for grading. The core expectations articulated in all 15 of the VALUE rubrics can and should be translated into the language of individual campuses, disciplines, and even courses. The utility of the VALUE rubrics is to position learning at all undergraduate levels within a basic framework of expectations such that evidence of learning can be shared nationally thorough a common dialog and understanding of student success.

Definition

Critical thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

Framing Language

This rubric is designed to be transdisciplinary, reflecting the recognition that success in all disciplines requires habits of inquiry and analysis that share common attributes. Further, research suggests that successful critical thinkers from all disciplines increasingly need to be able to apply those habits in various and changing situations encountered in all walks of life.
This rubric is designed for use with many different types of assignments and the suggestions here are not an exhaustive list of possibilities. Critical thinking can be demonstrated in assignments that require students to complete analyses of text, data, or issues. Assignments that cut across presentation mode might be especially useful in some fields. If insight into the process components of critical thinking (e.g., how information sources were evaluated regardless of whether they were included in the product) is important, assignments focused on student reflection might be especially illuminating.

Glossary

The definitions that follow were developed to clarify terms and concepts used in this rubric only.

- Ambiguity: Information that may be interpreted in more than one way.
- Assumptions: Ideas, conditions, or beliefs (often implicit or unstated) that are "taken for granted or accepted as true without proof." (quoted from www.dictionary.reference.com/browse/assumptions)
- Context: The historical, ethical, political, cultural, environmental, or circumstantial settings or conditions that influence and complicate the consideration of any issues, ideas, artifacts, and events.
- Literal meaning: Interpretation of information exactly as stated. For example, "she was green with envy" would be interpreted to mean that her skin was green.
- Metaphor: Information that is (intended to be) interpreted in a non-literal way. For example, "she was green with envy" is intended to convey an intensity of emotion, not a skin color.

Critical Thinking VALUE Rubric

Definition

Critical Thinking is a habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion.

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (cell one) level performance

	Capstone 4	Milestones 3	 2	Benchmark 1
Explanation of issues	Issue/problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown.	Issue/problem to be considered critically is stated without clarification or description.
Evidence Selecting and using information to investigate a point of view or conclusion	Information is taken from source(s) with enough interpretation/evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/evaluation. Viewpoints of experts are taken as fact, without question.
Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/hypothesis).	Specific position (perspective, thesis/hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/hypothesis).	Specific position (perspective, thesis/hypothesis acknowledges different sides of an issue.	Specific position (perspective, thesis/hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.