GENERAL EDUCATION LEARNING OUTCOMES ASSESSMENT: ORAL COMMUNICATION AND QUANTITATIVE LITERACY

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I. Introduction

General education assessment is a new responsibility of the Accreditation Liason Officer (ALO), but one that the Office of Undergraduate Education has embraced as an important method for measuring the extent to which the university's goals for general education are being met. In preparation for recent accreditation requirement changes in WASC, the Office of Undergraduate Education created a working group to identify key learning outcomes for general education at UCR and how to best assess those learning outcomes.

Our intention had been to assess two components of general education: (1) the University Writing Program, which is intended to give UCR undergraduate students essential skills in written communication, and (2) the newly-designed thematic alternative to campus breadth requirements. This alternative was organized around thematic concentrations that allowed students to explore a common theme (e.g. California or climate change) from a variety of disciplinary perspectives. We conducted the assessment of UWP (see University Writing Program Assessment Report). However, the new thematic concentrations failed to gain popularity among students and are now in the process of being phased out. The failure of the thematic concentrations necessitated a different approach to general education assessment.

In summer 2012, a working group was brought together by the Senate Chair of Educational Policy Martin Johnson and Vice Provost Steven Brint to discuss general education assessment at UC Riverside. This group consisted of faculty from the four colleges at UCR, members of the Faculty Senate Committee on Education Policy, and staff in the Office of Undergraduate Education. The group first identified potential learning outcomes for the general

education assessment by consulting the *UCR General Course Catalog*. The catalog outlines all of the general education requirements expected for all undergraduate students and those necessary for each of the four colleges: College of Humanities, Arts, and Social Sciences; Bourns College of Engineering; College of Natural and Agricultural Sciences; and School of Business Administration. UC Riverside currently requires all students to complete course requirements in the following areas: English composition (4-12 units), humanities (12-20 units), social sciences (12-16 units), ethnicity (4 units), foreign language (0-16 units), and natural sciences and mathematics (20 units). These requirements can be satisfied by a variety of courses outlined in the course catalog.

The group began by outlining learning outcomes set forth in the *Goals for an Undergraduate Education* section of the *UCR General Course Catalog.* These goals are as follows:

> A university education nurtures the critical skills of oral and written communication, including the exercise of these skills in a language other than one's own. It must teach students to become verbally and quantitatively literate, to analyze and synthesize, and to regard the acquisition of knowledge as a lifetime activity. A university education must promote tolerance of the opinions of others and an understanding of the mutual dependence of human beings on each other and on their natural environment. The student's university years also provide an opportunity to develop integrity, self-esteem, self-discipline, style, humanness, commitment to the general welfare, sensitivity to the interplay of environment and technology, and confidence that the human drama is worthy of a lengthy future. (University of California Riverside, 2011)

The committee judged that, in addition to written communication, the learning objectives most in need of review were the following: (1) quantitative literacy and (2) oral communication. The reasons we selected these learning objectives are as follows: Several committee members expressed the concern that the most popular general education classes in the natural sciences were not providing sufficient opportunities for students to gain quantitative reasoning skills. Others expressed concern about students' opportunities to improve their oral communication skills during a time of increasing class sizes. In a society in which data collection and data analysis plays such an important role, quantitative literacy is essential not only in jobs that require it but to

remain a well-informed citizen and participant in community life. Confidence in oral communication is equally important. Following graduation, many students take jobs that require the ability to communicate clearly not only in writing, but also orally.

The committee identified tolerance of the opinions of others, understanding the mutual dependence of human beings on each other and their natural environment, and commitment to the general welfare of others as learning outcomes in which the campus had a strong reputation for achievement, as exemplified by its high ranking in the *Washington Monthly* College Guide,[1] which rates colleges on these criteria, as well as its leading position among research universities in the proportion of students who engage in community volunteer work.[2]

We approached the study of quantitative literacy and oral communication in two ways: 1) by surveying the content of course syllabi for the campus's most popular general education courses and 2) by asking faculty who teach these courses to participate in an online survey to summarize the opportunities they provide students to develop skills in these areas in their courses.

We examined total enrollment in courses over the past three years to identify the most widely taken courses across campus that satisfy general education requirements. We included courses with more than 1000 students enrolled over three years. This list garnered 75 courses across all colleges at UCR. We excluded courses that are used for the University Writing Program, preparatory English courses, foreign language courses, and courses used only for specific majors. The final list of courses included 63 courses across 22 departments.

II. Course Syllabus Analysis

We first asked the Management Service Officer of each department to help us gather syllabi for each course over the past three years. Our goal was to examine syllabi for opportunities they provided students to develop their quantitative literacy and oral communication skills. We received information from all 22 departments. We received at least one

[1] http://washingtonmonthly.com/college_guide/rags_2012/national_university_rank.php

[2] http://ucrtoday.ucr.edu/2361

syllabus for 55 courses (87%) of the 63 on our final list. We evaluated a total of 146 syllabi for evidence of the opportunities they provided students to build quantitative literacy and oral communication skills. Many of the syllabi did not outline assignments in detail, creating difficulties in evaluation.

A. Opportunities to Develop Quantitative Literacy

We counted the following activities as evidence of opportunities for the development of quantitative literacy skills: mention of equations and/or interpretation in the course summary, assignments related to quantification, and descriptions of exams that include equations and/or interpretation. Of the 146 syllabi evaluated, we found 32 syllabi (21.9%) with calculation and quantitative interpretation requirements. These courses were in Mathematics, Sociology, and Statistics. All of the courses requiring calculation also required interpretation of quantitative data.

B. Opportunities to Develop Oral Communication Skills

We counted the following activities as evidence of opportunities for development of oral communication skills: mention of assignments or extra credit related to formal presentations, conducting interviews, video presentations, group presentations, or live debates. Of the 146 syllabi evaluated, 18 (12.3%) showed evidence of requirements for oral communication in the classroom. Many of the courses requiring oral communication were in Theatre and Dance. A few History, Political Science, and Sociology courses also showed evidence of providing students with these opportunities. While it appears that very few popular general education courses offer opportunities for the development of quantitative literacy or oral communication, syllabus data is incomplete. Most syllabi did not include summaries of assignments and exams and instead focused on expectations for course conduct, point distributions for assignments and exams, and a course schedule. To gain a better understanding of opportunities for quantitative literacy and oral communication development, we also surveyed instructors who taught these courses.

III. Faculty Survey Analysis

A total of 312 instructors taught the most popular general education courses over the last three years. Faculty and lecturers taught one to seven of the courses in our study; most were responsible for one or two courses. In six cases, one faculty member was solely responsible for a course. Eighty-two of the 312 are no longer employed at UCR. Many of these individuals were lecturers who taught general education courses as graduate students. In total, 138 out of 230 instructors currently employed at UCR (60%) answered our survey. These instructors responded for 60 courses and yielded 176 course responses.

The survey asked all instructors about opportunities for students to develop quantitative literacy (calculation and interpretation) and oral communication (through presentations, interviews, and debates). The survey also asked instructors to discuss how their sections were organized and how they encouraged participation in class. A copy of the survey instrument is included as Appendix A. We report results for three categories of courses: (1) Arts and Humanities, (2) Social Sciences, and (3) Mathematics and Natural Sciences. Courses are grouped according to the general education requirement they fulfill (see Appendix B). We received 35 course responses within Arts and Humanities, 38 within Social Sciences, and 103 within Mathematics and Natural Sciences.

A. Opportunities to Devlop Quantitative Literacy

We discuss the results for quantitative literacy first. We were interested in how often and in what settings students had the opportunity to make quantitative calculations and to interpret numbers. Table 1 displays the summary of how often students are required to make quantitative calculations. A majority of courses (83%) in arts and humanities did not require calculations at all. Similarly, half of social science courses required calculations less than once a month or not at all. Just under one-third of social science courses required calculations multiple times per week. As expected, a majority (76%) of math and science courses required calculations multiple times per week. Overall, 52% of courses required calculations multiple times per week. In total 70% of

respondents reported that their courses require at least some form of calculation during the course.

In the courses from which we have responses, most calculations occur during section or lab (62%), during exams (60%), and/or for homework (57%) (see Table 2). Mathematics and natural science courses require calculations very frequently in all settings. Social science courses most often require calculations in section or lab and/or for homework assignments (42%) and least frequently in lecture (24%). Almost 40% of course respondents did not require calculations in courses. Arts and humanities courses tend not to require calculations.

Almost 30% of courses from which we received responses require students to memorize equations, and just over 25% of courses require students to identify the proper equation necessary to complete a task (see Table 3). Mathematics and natural science courses most frequently require students either to memorize equations or to identify them for proper use. A majority of social science (53%) and humanities courses (86%) do not require students to use equations. Over 40% of social science courses do require students to use or memorize equations in their courses. Overall, 47% of courses require use of equations multiple times per week. A majority of math and science courses (74%) require the use of equations multiple times per week, but the majority of social science and humanities courses do not require the use of equations this frequently (see Table 4). Over 50% of courses require use of equations in lecture, in section or lab, on homework, and on exams. These trends are most prevalent in mathematics and natural science courses and are sometimes in evidence in social science courses (see Table 5).

When asked about whether students are required to interpret the meaning of numbers, responding instructors indicated that students must interpret numbers in tables (53%), interpret calculations (59%), and interpret numbers in text (65%). As Table 6 indicates, instructors for nearly one-quarter of courses in the sample indicated that interpretation of numbers is not required in the course. Arts and humanities courses are particularly unlikely to require interpretation of numbers. Table 7 shows that most courses (53%) required students to interpret

numbers multiple times a week. Over 70% of math and science courses and 34% of social sciences required interpretations multiple times per week. The social sciences require students to interpret numbers most often (61%) in lecture while the mathematics and natural science courses require interpretation more often on exams (85%) (see Table 8).

These findings suggest that UCR students have opportunities to develop quantitative literacy in popular mathematics and natural science general education courses, and to a lesser degree in popular social science general education courses. Not many humanities courses offer students opportunities to develop quantitative literacy.

B. Opportunities to Develop Oral Communication Skills

We now discuss results for oral communication opportunities. We asked faculty members about oral communication opportunities in their courses, both those that were required and those that were optional. We examined five types of presentations: (1) individual (solo) presentations, (2) group presentations, (3) video presentations, (4) live debate, and (5) interviews. The results are presented in Table 9. Few courses required any one of these opportunities. Individual (10%) and group presentations (13%) were the most popular required oral communication opportunities. Slightly more courses made presentations optional. Live debates (20%), individual presentations (17%), and group presentations (14%) were most frequently offered as options in courses.

Arts and humanities courses offered oral communication opportunities more often than social science or mathematics and natural science courses. Almost 29% of arts and humanities courses required debates while 32% of social science courses offered debates as an optional activity. Within social sciences, individual presentations, group presentations, and interviews were the most frequently required activities (13% each). We also asked instructors if they offered any additional oral communication activities in their courses (see Table 10). Faculty were asked whether students are required to contribute to discussion in lecture, section/lab, or not at all. A majority of courses (52%) required students to participate in discussion section or lab, and

slightly more than one quarter (26%) required students to participate in lecture (see Table 11). Almost 40% of popular general education courses in our sample do not require students to participate in lecture or section. Some instructors indicated that their failure to provide students with opportunities for participation was due primarily to large class sizes.

In cases where participation was required, we asked instructors about how participation was graded (see Table 12). Almost 30% of courses did not give students points for participation. Approximately 40% of instructors reported that 1-10% of a student's grade is determined by participation points and just fewer than 11% of courses report that over 20% of a student's grade is attributed to participation. Mathematics and natural science courses tended to provide no credit for participation (41%) or to attribute 1-5% of a student's grade to participation (35%). Within the social sciences, 26% of courses reported that over 20% of a student's grade was determined by participation points and almost 16% did not offer credit for participation. Arts and humanities courses offered more points for participation. While 11% reported not providing credit for participation, 20% of courses offered more than 20% of points for participation.

When asked about incentives used to encourage participation, many instructors cited course points (see Table 13). Instructors also used extra credit, clicker participation, and reporting of a discussion with one's neighbor to the class. Arts and humanities and social science courses more frequently use course points compared to mathematics and natural science courses. Additional answers offered by faculty to our question about methods for encouraging participation included the following: essays, peer reviews, or case studies; quizzes; hands-on exercises; concept maps; problems in class; encouragement to attend office hours; discussion in class; and activities run by teaching assistants (see Table 14).

Because many courses have discussion or lab sections, we asked faculty about the structure of those sections (see Table 15). A majority of popular general education courses require discussion in sections (60%) or require students to interact with one another in fulfilling specific activities (51%). Many instructors allowed their teaching assistants to decide how they

would run their sections (39%). Just over 20% of sections were run like a second lecture. These results are consistent across all three categories of courses.

IV. Conclusions

While the investigation of syllabi did not provide much insight into opportunities for the development of quantitative literacy and oral communication skills within general education courses, the faculty survey suggests that students at UC Riverside are likely to take a course that will provide them with opportunities to develop their quantitative literacy skills. This conclusion must be treated with caution, however, given that not all instructors of popular general education courses responded to the survey, and particularly because the research literature indicates that lecturers and graduate student instructors are somewhat less likely to create challenging teaching and learning environments than ladder-rank faculty members (see, e.g., Bettinger and Long 2005; Ehrenberg and Zhang 2006: Umbach 2007).

The survey study suggests that many students do not have sufficient opportunities to develop their oral communication skills as they complete their general education requirements. In particular, formal oral communication activities, such as presentations and debates, appear to be insufficient in the campus's most popular general education courses. Many students are encouraged to participate in lectures and discussion/lab sections but these opportunities are less challenging than giving formal presentations or participating in debates.

V. References

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APPENDIX A
General Education Survey

Email Solicitation:

Dear Professor [LASTNAME],

We have been asked to assess our general education requirements by the Western Association of Schools and Colleges (WASC), our regional accrediting agency. To gain a better understanding of our general education courses and how they align with learning outcomes outlined in the UCR Catalog for general education, we are asking professors who teach our most popular general education courses for information about learning activities in their courses.

The joint faculty-administration committee, which we co-chaired, identified quantitative literacy and oral communication as skills of particular interest. We are less certain that students are developing these skills than some others specified in the UCR catalog. We understand that not all popular general education courses offer these learning opportunities for students; rather than viewing these as requirements of your courses, we plan to use these responses to construct an inventory of opportunities for quantitative development and oral communication available in our current list of popular general education courses.

If you have taught more than one of the general education courses in which we are interested, we hope that you will answer the survey separately for each course.

We want to assure you that all of your responses will be confidential and that no identifying information will be released to WASC or to the public. We want to reiterate that this survey is to help us better determine how to evaluate our general education requirements at UCR.

To participate in this survey, please log on to: ieval.ucr.edu with your netID and password. You will be provided a link to the survey for each course you have taught on our general education list. We are hoping to compile the data by Friday, October 19th. We greatly appreciate your participation.

If you have any questions about this survey or this inquiry, please contact Allison Cantwell (allison.cantwell@ucr.edu) who will be assisting us with this survey.

Thank you and best wishes,

Steven Brint
Vice Provost, Undergraduate Education

Martin Johnson
Chair, Committee on Educational Policy (AY 2011-12)

INTRODUCTION TO SURVEY:

UCR has been asked to assess our **general education requirements** by the Western Association of Schools and Colleges (WASC), our regional accrediting agency. WASC has asked for an interim report in November and assessment of general education is intended to be part of that report.

The joint faculty-administration committee that met to discuss general education identified quantitative literacy and oral communication as skills of particular interest. The survey consequently focuses on quantitative literacy and oral communication opportunities in your courses . We understand that not all popular general education courses offer these learning opportunities for students. Rather than viewing these as requirements of your courses, we plan to use the responses to the survey to construct an inventory of opportunities for development of quantitative literacy and oral communication skills available in our current list of popular general education courses.

Since you have taught [NAME OF CLASS], a popular general education course, in at least one quarter in the last three years, we are interested in hearing more about the opportunities you offered students to develop skills in quantitative literacy and/or oral communication.

Your responses will remain completely confidential. Your responses are also voluntary. This survey does not pose any known risks to your health and will take approximately 5-10 minutes to complete.

If you agree to participate in this survey, please continue by answering the survey below.

A. Quantitative Literacy

Part of the general education mission at UCR is to help students develop quantitative literacy. Please answer the following questions about opportunities for students to develop quantitative literacy in your class.

1. How often are students required to make quantitative calculations in your course?
   - Multiple times per week
   - Once a week
   - Once every two weeks
   - Once a month
   - Less than once a month
   - Never

2. In what setting(s) are students required to make quantitative calculations in your course? [check all that apply]
   - In lecture
   - In section or lab
   - For homework assignments
   - For exams
   - Students are not required to make quantitative calculations in my course

3. Are students required to learn equations relevant to your course? (please check only one.)

- Yes, students must memorize equations.
- Yes, students must be able to identify proper equations for a task from a list of equations.
- No, students are provided the correct equations for a task.
- No, students are not required to learn or use equations in this course.

4. How often do students use equations in your course?

- Multiple times per week
- Once a week
- Once every two weeks
- Once a month
- Less than once a month
- Never

5. In what setting(s) are students required to learn equations relevant to your course? [check all that apply]

- In lecture
- In section or lab
- For homework assignments
- For exams
- Students are not required to learn equations in my course

6. Are students required to interpret the meaning of numbers in your course? [check all that apply]

- Students are required to interpret the meaning of numbers in tables
- Students are required to interpret the meaning of calculations they make
- Students are required to interpret the meaning of numbers in text
- Students are not required to interpret the meaning of numbers in my course

7. How often are students required to interpret the meaning of numbers in your course?

- Multiple times per week
- Once a week
- Once every two weeks
- Once a month
- Less than once a month
- Never

8. In what setting are students required to interpret the meaning of numbers in your course? [check all that apply]

- In lecture
- In section or lab
- For homework assignments
- For exams
- Students are not required to interpret the meaning of numbers in my course

B. Oral Communication

Part of the general education mission at UCR is to help students develop oral communication skills. Please answer the following questions about opportunities for students to develop their oral communication skills in your classroom.

For questions 9-13, please indicate whether each type of oral communication activity is required, optional, or not offered in your course.

9. Individual oral presentations:
Required
Optional
Not offered

10. Group presentations:
Required
Optional
Not offered

11. Video presentations
Required
Optional
Not offered

12. Live debate
Required
Optional
Not offered

13. Conduct at least one interview
Required
Optional
Not offered

14. Do you offer any other type(s) of oral communication exercises in your course? (please explain)

_____
_____
_____

15. Are students required to contribute to class discussion?

Students are required to contribute to class discussion in lecture.
Students are required to contribute to class discussion in discussion lab sections.
Students are not required to contribute to class discussion either in lecture or sections.

16. What percentage of a student's grade is determined by participation in class?

0%
1-5%
6-10%
11-15%
16-20%
greater than 20%

17. What techniques do you use to encourage participation in class? [check all that apply]

Course points
Extra credit
Clickers
Discuss concepts and/or problems with neighbor(s) in class
Report conclusions from discussions with neighbor(s) in class
Other (please explain)

_____
_____
_____

18. How would you characterize the format of the discussion or lab section(s) in your course ? [check all that apply]

The section(s) are run like another lecture by the teaching assistant
The section(s) require specific activities in which students engage with one another.
The section(s) require discussion of specific topics.
My teaching assistants decide how they would like to run their sections.
This course does not have discussion or lab sections.
Other (please explain)

_____
_____
_____

APPENDIX B
Course Categories

Course Number	Course Title	General Education Category
ANTH 001	Cultural Anthropology	Social Science
BIO 005A	Introduction to Cell and Molecular Biology	Math and Science
BIO 005B	Introduction to Organismal Biology	Math and Science
BIO 005C	Introductory Evolution and Ecology	Math and Science
BIO 030	Human Reproduction and Sexual Behavior	Math and Science
CHEM 001A	General Chemistry	Math and Science
CHEM 001B	General Chemistry	Math and Science
CHEM 001C	General Chemistry	Math and Science
CRWT 056	Introduction to Creative Writing	Humanities
CS 006	Effective Use of the World Wide Web	Math and Science
CS 008	Introduction to Computing	Math and Science
CS 010	Introduction to Computer Science for Science	Math and Science
DNCE 005	Introduction to Dance	Humanities
DNCE 007	Dance: Cultures and Contexts	Humanities
ECON 002	Introduction to Macroeconomics	Social Science
ECON 003	Introduction to Microeconomics	Social Science
ENTM 010	Natural History of Insects	Math and Science
ETST 001	Introduction to the Study of Race and Ethnicity	Social Science
GEO 004	Natural Hazards and Disasters	Math and Science
GEO 008	Earthquake Country	Math and Science
GEO 009	Oceanography	Math and Science
HIST 010	World History: Prehistory to 1500	Humanities
HIST 015	World History: 1500 to 1900	Humanities
HIST 020	World History Twentieth Century	Humanities
HIST 030	Themes and Personalities in History	Humanities
LING 020	Language and Linguistics	Humanities
MATH 004	Introduction to College Mathematics for Business and the Social Sciences	Math and Science
MATH 005	Precalculus	Math and Science
MATH 008A	Introduction to College Mathematics for the Sciences	Math and Science
MATH 008B	Introduction to College Mathematics for the Sciences	Math and Science
MATH 009A	First-Year Calculus	Math and Science
MATH 009B	First-Year Calculus	Math and Science
MATH 009C	First-Year Calculus	Math and Science
MATH 010A	Calculus for Several Variables	Math and Science
MATH 010B	Calculus for Several Variables	Math and Science
MATH 022	Calculus for Business	Math and Science
MATH 046	Introduction to Ordinary Differential Equations	Math and Science

PHIL 001	Introduction to Philosophy	Humanities
PHIL 002	Contemporary Moral Issues	Humanities
Course Number	**Course Title**	**General Education Category**
PHIL 005	Evil	Humanities
PHIL 007	Introduction to Critical Thinking	Humanities
PHYS 002A	General Physics	Math and Science
PHYS 002B	General Physics	Math and Science
PHYS 002C	General Physics	Math and Science
PHYS 006	The Violent Universe	Math and Science
PHYS 040A	General Physics	Math and Science
PHYS 040B	General Physics	Math and Science
PHYS 040C	General Physics	Math and Science
POSC 010	American Politics	Social Science
POSC 020	World Politics	Social Science
PSYC 001	Introductory Psychology	Social Science
PSYC 002	Introductory Psychology	Social Science
PSYC 011	Psychological Methods: Statistical Procedures	Social Science
PSYC 012	Psychological Methods: Research Procedures	Social Science
RLST 012	Religious Myths and Rituals	Humanities
SOC 001	Introduction to Sociology	Social Science
SOC 004	Methods of Sociological Inquiry	Social Science
SOC 005	Statistical Analysis	Social Science
THEA 010	Introduction to Acting	Humanities
WMST 001	Gender and Sexuality	Social Science

Table 1. How often are students required to make quantitative calculations in your course?								
	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
Multiple times per week	1	2.9%	12	31.6%	78	75.7%	91	51.7%
Once a week	0	0.0%	2	5.3%	7	6.8%	9	5.1%
Once every two weeks	1	2.9%	2	5.3%	4	3.9%	7	4.0%
Once a month	3	8.6%	2	5.3%	3	2.9%	8	4.6%
Less than once a month	0	0.0%	5	13.2%	3	2.9%	8	4.6%
Never	29	82.9%	14	36.8%	4	3.9%	47	26.7%
Missing	1	3.9%	1	2.6%	4	3.9%	6	3.3%
Total	35	100.0%	38	100.0%	103	100.0%	176	100.0%

Table 2. In what setting(s) are students required to make quantitative calculations in your course?*								
	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
In lecture	1	2.9%	9	23.7%	73	70.9%	83	47.2%
In section or lab	4	11.4%	16	42.1%	89	86.4%	109	61.9%
For homework assignments	3	8.6%	16	42.1%	82	79.6%	101	57.4%
For exams	2	5.7%	15	39.5%	88	85.4%	105	59.7%
Quantitative calculations are not required	29	82.9%	15	39.5%	4	3.9%	48	27.3%
Missing	1	2.9%	2	5.2%	2	1.9%	5	2.8%

*Respondents could check more than one answer. Percentages are out of total N.

Table 3. Are students required to learn equations relevant to your course?

	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
Yes, students must memorize equations.	0	0.0%	8	21.1%	44	42.7%	52	29.6%
Yes, students must be able to identify proper equations for a task from a list of equations.	0	0.0%	5	13.2%	40	38.8%	45	25.6%
No, students are provided the correct equations for a task.	0	0.0%	0	0.0%	7	6.8%	7	4.0%
No, students are not required to learn or use equations in this course.	33	94.3%	23	60.5%	9	8.7%	65	36.9%
Missing	2	5.7%	2	5.3%	3	2.9%	7	4.0%
Total	35	100.0%	38	100.0%	103	100.0%	176	100.0%

Table 4. How often do students use equations in your course?

	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
Multiple times per week	0	0.0%	7	18.4%	76	73.8%	83	47.2%
Once a week	0	0.0%	4	10.5%	4	3.9%	8	4.6%
Once every two weeks	0	0.0%	1	2.6%	10	9.7%	11	6.3%
Once a month	1	2.9%	1	2.6%	3	2.9%	5	2.8%
Less than once a month	2	5.7%	4	10.5%	2	1.9%	8	4.6%
Never	30	85.7%	20	52.6%	5	4.9%	55	31.3%
Missing	2	5.7%	1	2.6%	3	2.9%	6	3.4%
Total	35	100.0%	38	100.0%	103	100.0%	176	100.0%

Table 5. In what setting(s) are students required to learn equations relevant to your course?*								
	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
In lecture	0	0.0%	13	34.2%	88	85.4%	101	57.4%
In section or lab	0	0.0%	15	39.5%	88	85.4%	103	58.5%
For homework assignments	1	2.9%	13	34.2%	82	79.6%	96	54.6%
For exams	0	0.0%	14	36.8%	88	85.4%	102	58.0%
Quantitative calculations are not required	30	85.7%	19	50.0%	6	5.8%	55	31.3%
Missing	4	11.4%	3	7.9%	2	1.9%	9	5.1%

*Respondents could check more than one answer. Percentages are out of total N.

Table 6. Are students required to interpret the meaning of numbers in your course? *								
	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
Students are required to interpret the meaning of numbers in tables.	3	8.6%	24	63.2%	67	65.1%	94	53.4%
Students are required to interpret the meaning of calculations they make.	1	2.9%	18	47.4%	85	82.5%	104	59.1%
Students are required to interpret the meaning of numbers in text.	8	22.9%	23	60.5%	83	80.6%	114	64.8%
Students are not required to interpret the meaning of numbers in my course.	22	62.9%	9	23.7%	9	8.7%	40	22.7%
Missing	5	14.3%	1	2.6%	3	2.9%	9	5.1%

*Respondents could check more than one answer. Percentages are out of total N.

Table 7. How often are students required to interpret the meaning of numbers in your course?								
	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
Multiple times per week	4	11.4%	13	34.2%	76	73.8%	93	52.8%
Once a week	2	5.7%	7	18.4%	6	5.8%	15	8.5%
Once every two weeks	2	5.7%	3	7.9%	6	5.8%	11	6.3%
Once a month	2	5.7%	5	13.2%	2	1.9%	9	5.1%
Less than once a month	2	5.7%	1	2.6%	1	1.0%	4	2.3%
Never	21	60.0%	9	23.7%	9	8.7%	39	22.2%
Missing	2	5.7%	0	0.0%	3	2.9%	5	2.8%
Total	35	100.0%	38	100.0%	103	100.0%	176	100.0%

Table 8. In what setting(s) are students required to interpret the meaning of numbers in your course?*								
	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
In lecture	6	17.1%	23	60.5%	84	81.6%	113	64.2%
In section or lab	7	20.0%	18	47.4%	83	80.6%	108	61.4%
For homework assignments	6	17.1%	21	55.3%	77	74.8%	104	59.1%
For exams	5	14.3%	18	47.4%	87	84.5%	110	62.5%
Quantitative calculations are not required	22	62.9%	9	23.7%	9	8.7%	40	22.7%
Missing	3	8.6%	0	0.0%	2	1.9%	5	2.8%

*Respondents could check more than one answer. Percentages are out of total N.

Table 9. Please indicate whether each type of oral communication activity is required, optional, or not offered in your course.								
	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
Individual oral presentations								
Required	8	22.9%	5	13.2%	4	3.9%	17	9.7%
Optional	9	25.7%	7	18.4%	14	13.6%	30	17.1%
Not Offered	17	48.6%	26	68.4%	81	78.6%	124	70.5%
Missing	1	2.9%	0	0.0%	4	3.9%	5	2.8%
Total	*35*	*100.0%*	*38*	*100.0%*	*103*	*100.0%*	*176*	*100.0%*
Group presentations								
Required	9	25.7%	5	13.2%	9	8.7%	23	13.1%
Optional	9	25.7%	7	18.4%	8	7.8%	24	13.6%
Not Offered	16	45.7%	25	65.8%	80	77.7%	121	68.8%
Missing	1	2.9%	1	2.6%	6	5.8%	8	4.6%
Total	*35*	*100.0%*	*38*	*100.0%*	*103*	*100.0%*	*176*	*100.0%*
Video presentations								
Required	0	0.0%	1	2.6%	2	1.9%	3	1.7%
Optional	10	28.6%	2	5.3%	6	5.8%	18	10.2%
Not Offered	24	68.6%	35	92.1%	88	85.4%	147	83.5%
Missing	1	2.9%	0	0.0%	7	6.8%	8	4.6%
Total	*35*	*100.0%*	*38*	*100.0%*	*103*	*100.0%*	*176*	*100.0%*
Live debate								
Required	10	28.6%	3	7.9%	2	1.9%	15	8.5%
Optional	6	17.1%	12	31.6%	17	16.5%	35	19.9%
Not Offered	18	51.4%	23	60.5%	75	72.8%	116	65.9%
Missing	1	2.9%	0	0.0%	9	8.7%	10	5.7%
Total	*35*	*100.0%*	*38*	*100.0%*	*103*	*100.0%*	*176*	*100.0%*
Conduct at least one interview								
Required	0	0.0%	5	13.2%	1	1.0%	6	3.4%
Optional	7	20.0%	6	15.8%	3	2.9%	16	9.1%
Not Offered	26	74.3%	26	68.4%	93	90.3%	145	82.4%
Missing	2	5.7%	1	2.6%	6	5.8%	9	5.1%
Total	*35*	*100.0%*	*38*	*100.0%*	*103*	*100.0%*	*176*	*100.0%*

Table 10. Do you offer any other type(s) of oral communication exercises in your course? (please explain)*				
	Humanities (N=35)	Social Science (N=38)	Math and Science (N=103)	Total (N=176)
	F	F	F	F
No; No reason provided.	1	4	10	15
No; Class size too large.	0	2	8	10
Yes; Students participate in group work or discussions in their discussion sections.	10	7	18	35
Yes; Students may ask questions or participate in q and a during lecture.	3	4	7	14
Yes; Students participate in group work or discussion during lecture.	11	8	4	23
Maybe; It is up to the teaching assistant's discretion for discussion sections.	2	1	3	6
Other; Only during certain sections (e.g., Honors) or courses (e.g., Summer Courses).	0	2	0	2
Did not include a comment	17	19	65	101

*Categories are not mutually exclusive due to variety of themes in one response.

Table 11. Are students required to contribute to class discussion?*

	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
Students are required to contribute to class discussion in lecture.	14	40.0%	10	26.3%	22	21.4%	46	26.1%
Students are required to contribute to class discussion in discussion lab sections.	25	71.4%	23	60.5%	44	42.7%	92	52.3%
Students are not required to contribute to class discussion either in lecture or sections.	5	14.3%	11	29.0%	49	47.6%	65	36.9%
Missing	0	0.0%	0	0.0%	0	0.0%	0	0.0%

*Respondents could check more than one answer. Percentages are out of total N.

Table 12. What percentage of a student's grade is determined by participation in class?

	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
0%	4	11.4%	6	15.8%	42	40.8%	52	29.6%
1-5%	0	0.0%	11	29.0%	36	35.0%	47	26.7%
6-10%	7	20.0%	7	18.4%	9	8.7%	23	13.1%
11-15%	9	25.7%	3	7.9%	7	6.8%	19	10.8%
16-20%	0	0.0%	0	0.0%	0	0.0%	0	0.0
greater than 20%	7	20.0%	10	26.3%	2	1.9%	19	10.8%
Missing	8	22.9%	1	2.6%	7	6.8%	16	9.1%
Total	35	100.0%	38	100.0%	103	100.0%	176	100.0%

Table 13. What techniques do you use to encourage participation in class?*

	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
Course points	23	65.7%	24	63.2%	36	35.0%	83	47.2%
Extra credit	9	25.7%	15	39.5%	19	18.5%	43	24.4%
Clickers	3	8.6%	11	29.0%	26	25.2%	40	22.7%
Discuss concepts and/or problems with neighbor(s) in class	20	57.1%	14	36.8%	38	36.9%	72	40.9%
Report conclusions from discussions with neighbor(s) in class	13	37.1%	9	23.7%	19	18.5%	41	23.3%
No Incentive	1	2.9%	4	10.5%	17	16.5%	22	12.5%
Other (please explain)	18	51.4%	9	23.7%	32	31.1%	59	33.5%
Missing	0	0.0%	1	2.6%	1	1.0%	2	1.1%

*Respondents could check more than one answer. Percentages are out of total N.

Table 14. Comments Data				
	Humanities (N=18)	Social Science (N=9)	Math and Science (N=32)	Total (N=59)
	F	F	F	F
Essays, Peer Reviews, and/or Case Studies	2	2	2	6
Quizzes	1	1	5	7
Hands-on Exercises and/or drawing from personal experience	3	0	4	7
Jigsaws and/or Concept Maps	0	0	1	1
Problem of the Day / Problems in Class	2	2	14	18
Encourage Students to go to Office Hours or interaction with Professor	5	2	18	25
Class and Small Group Discussion and Exercises	7	5	1	13
Teaching assistants run various participation activities	5	3	5	13

*Categories are not mutually exclusive due to variety of themes in one response.

Table 15. How would you characterize the format of the discussion or lab section(s) in your course? *

	Humanities (N=35)		Social Science (N=38)		Math and Science (N=103)		Total (N=176)	
	F	%	F	%	F	%	F	%
The section(s) are run like another lecture by the teaching assistant.	1	2.9%	8	21.1%	28	27.2%	37	21.0%
The section(s) require discussion of specific topics.	27	77.1%	27	71.1%	52	50.5%	106	60.2%
The section(s) require specific activities in which students engage with one another.	18	51.4%	23	60.5%	48	46.6%	89	50.6%
My teaching assistants decide how they would like to run their sections.	16	45.7%	20	52.6%	33	32.0%	69	39.2%
This course does not have discussion or lab sections.	5	14.3%	2	5.3%	0	0.0%	7	4.0%
Other (please explain)	5	14.3%	4	10.5%	12	11.7%	21	11.9%
Missing	1	2.9%	0	0.0%	3	2.9%	4	2.3%

*Respondents could check more than one answer. Percentages are out of total N.