

PROFICIENCY INFUSION GUIDELINES

These are guidelines, not a checklist of required elements. Course proposals should include an explanation of how the course is suitable to the requirement, understanding that the approval committee will consider courses that approach these elements creatively, with disciplinary norms in mind.

Not every course is suited to every proficiency; should you choose to infuse a course, you should select the proficiencies that best balance course content and course assignments (i.e. infusion of any proficiency should not infringe or radically change overall course content). Teaching of the proficiency should be in the service of course content. If it alters the content then the course should be redesigned and resubmitted to the college for approval as a new course.

Numeracy Infusion Guidelines

DEFINITION AND EXPLANATION OF THE PROFICIENCY

Numeracy:

- a proficiency with numbers and measures;
- confidence and competence in numerical calculation;
- confidence and competence in graphical interpretation
- confidence and competence in estimation skills;
- the ability to evaluate and synthesize quantitative information accurately;
- to be aware of and/or enjoy the patterns in mathematics that can enhance the appreciation/enjoyment of, for example, art and music.
- an inclination to use quantitative reasoning and fundamental notions of number and chance in a variety of contexts;

OBJECTIVES

What does a “numeracy infused” course target? The primary target is an attitude that quantitative thinking stops when exiting math class. The emphasis is to increase basic competence and confidence in discussing and using the skills listed above. The course should aim to develop an inclination to use numbers where appropriate. The tool we have discussed is problem solving in a variety of contexts.

COURSE READINGS/MATERIALS

Because of the diverse nature of numeracy-infused courses, the readings and materials must be determined by the instructor and the discipline. Useful readings to help understand numeracy are posted in the Numeracy Blackboard Course; however, these are primarily designed for course instructors rather than students.

ASSIGNMENTS

Significant readings of papers/ use of resources (databases) in the field which require the student to verify computations, explain why certain methodologies were used, explain the answer that results from the computation and why the result is significant to the problem under discussion. The student may want to offer alternative numerical ideas with justification of what is appropriate and what is not.

Multi-staged assignments: series of smaller assignments emphasizing questions that require aspects of quantitative reasoning, a demonstration that a student has the basic skill set to do the estimation or computation, an understanding of what is to be measured and how that measure relates to the broader question given the context. It is generally thought that there needs to be some level of jump starting the process in class (e.g. G. Browne's class.) These exercises should lead to a culminating project or paper where the numerical components are included and explained accurately by the student.

Reflective pieces which requires the student to detail the kinds of skills they needed to acquire and clear explanation of how they reasoned their answers. In order to address the issue of increasing confidence and competence, one would hope that students would demonstrate that the skills are acquired and that they can be used to inform the problem considered.

Tutorials or software created to address numeracy skills, e.g. Eco-Beaker, simulations in game theory. (Resources could be developed to help students practice estimation skills, graphical reasoning skills, or whatever skill is needed to work on the project. These resources would help the student self-assess their level of ability and target weak areas.) Use and feedback of such information would be valuable, particularly if they benchmarked initial skills and then re-evaluated them at the end of the course.

TESTS AND EXAMS

In order to properly assess students' facility with aspects of numeracy, specific questions on in-class tests and/or exams are necessary. Numeracy skills are effectively evaluated on tests and exams. The number of numeracy-focused questions would be determined by the specific course (e.g., a history exam would make different use of quantitative questions than a physics course).

GRADING

Since numeracy exercises will be incorporated into various aspects of the course, determining a percentage of numeracy for grading is difficult. However, at least one-third of the various course activities should include numeracy in some form for the course to be considered infused.

PROFICIENCY-SPECIFIC INFORMATION

Evaluation of Proficiency: Evaluation of student performance should be tied to what is actually required for a course to be marked as infused.

From the Oakland Course Questionnaire (stock):

- Explain how numeracy will be addressed in the course.
- How will the numeracy performance of a student in the course be evaluated?
- Identify all evaluation methods that will be used to assess numeracy performance in the course. Essays, tests, papers, problem solving projects, simulations, tutorials.
- If the course is applying to meet numeracy requirements, explain how it will meet the following criteria:
 - student work involves a multi-stage problem which requires significant application of numeracy ideas. (This problem shall count for at least 20% of grade.)
 - These stages will involve several smaller graded assignments or one large project/paper where at least 50 % of the paper/project requires the student to explain clearly the methodologies and the rationale for using numerical ideas.
 - Reading assignments will require students to investigate and comment on numerical solutions to problems.
 - There will be some level of reflection on the proficiency (short answer-index card assignment, oral responses, essay, assessment question on an exam, survey at the end of the course.)
- Describe the on-going process that will be used at the department level of review the course and ensure quality. We believe that if Blackboard is used, chairs could be given access to the courses to determine whether or not the course is living up to the billing. Academic freedom? Maybe a departmental survey at the end of the class?

GENERAL ASSESSMENT GUIDELINE FOR EACH PROFICIENCY

Instructors should be aware that the University is charged with assessing the success of infusing courses with proficiencies. The best assessment will be based upon what faculty members believe is happening in their classrooms. The Core has adopted the principle that, on a department-wide basis, instructors teaching infused courses will meet to evaluate the extent to which students are attaining the chosen proficiency. These meetings will be evidence- and criteria-based. That is, evidence from student work and the application of criteria chosen by the instructors should be the basis of discussions at meetings held at the end of each year or semester. Brief reports will summarize the conclusions reached, the basis upon which they were made, one or two suggestions for improving instruction, and possible requests for resources or faculty development to facilitate those improvements.