**2014-2015 Assessment Grants**

**Summary of Research and Findings**

**ChemE/ME- Ethics**

While all five majors in UCSB’s College of Engineering include learning outcomes related to ethical responsibility, faculty sometimes struggle to understand the parameters of the outcomes and, by extension, to develop effective assessments for it.

In this project, faculty from the departments of Chemical and Mechanical Engineering sought to understand how this outcome was understood by faculty and by students. The primary goal of the project was to use this investigation to either revise the outcome in order to develop specific and measurable performance indices; developing a rubric for assessing the outcome; and/or fostering other practices focusing on how well the ethics outcomes were being achieved and how that achievement could be improved. A secondary goal was to understand how students enrolled in an engineering ethics course learned ethics relative to students who did not enroll in the course.

To investigate these questions, data were collected from Chemical and Mechanical engineering seniors and faculty via surveys and focus groups. Analysis indicates that while the majority of students agreed that while a thorough understanding of engineering ethics was crucial, opportunities to learn engineering ethics were inconsistent within the departments of Chemical and Mechanical Engineering. A rubric to assess characteristics associated with the ethics outcome was also piloted as part of the assessment.

Based on the results of the assessment, the Associate Dean in the College of Engineering will convene structured discussions with faculty focused on developing assignments, instructional modules, and approaches to teaching engineering ethics. These will be included in the ABET accreditation process.

**Sociology**

Faculty in the Sociology department have expressed concern that the analytical skills of undergraduate majors are insufficiently developed for successful performance in upper-division courses. To understand whether a need existed to foster these skills in lower-division courses, interviews were conducted with 25 sociology faculty. Interviews reveal consensus among faculty about definitions of “strong analytical skills.” Faculty also expressed agreement about how and when these skills should be developed in the department’s courses. However, many faculty do not believe the program provides adequate opportunity to develop these skills and the majority support reconstituting a lower division methods course to support this development. These findings will inform departmental discussions about reconstituting a course and lobbying for resources to support the course; making changes to the existing major; and/or making changes to existing courses in order to foster the development of these skills.

**ChemE**

Based on results from a previous assessment grant, the Chemical Engineering Department implemented a number of pedagogical changes to support improved student writing in ChemE180B, a required lab course.

The assessment consisted of two parts. First, a rubric developed with input from ChemE faculty was applied to a sampling from the four required lab reports in the 180b course. The same rubric was applied to lab reports from reports written earlier, before changes made as a result of the 2013 assessment had been implemented. Findings indicate that students showed improvement on every rubric item related to writing, with the exception of including appropriate levels of descriptive detail. Students showed the most improvement in the area of logical idea flow, and on effective use of visual aids. Despite these findings, however, analysis indicated considerable room for improvement.

Researchers also gathered data from students via survey and focus groups to compare student experiences learning technical writing before and after the changes implemented following the 2013 assessment. Students indicated that written and verbal feedback was helpful for developing their writing, though half were not satisfied with preparation for writing overall. Students also provided specific suggestions for what they felt would be more helpful. The Department of Chemical Engineering is examining how to insert writing more regularly throughout their course sequence as a result of this assessment, as well as providing more examples of strong lab reports to students in 180b.

**GE Area C**

The Assessment Research Group conducted an indirect assessment of the GE Area C: Science, Mathematics, and Technology learning outcomes by including a series of questions addressing student awareness and perception of the GE program, and self-reported gains on the particular skills articulated in the Area C learning outcomes in the spring 2014 University of California Undergraduate Experience Survey (UCUES) instrument.

The research questions addressed by this assessment were:

• To what extent have the courses taken to satisfy the GE Area C requirement helped students achieve the Area C learning outcomes?

• How do students perceive the importance, the value, and the contribution of the General Education program requirements to their overall undergraduate education at UC Santa Barbara?

The GE program exposes students to a breadth of ideas and practices to help them develop approaches to scholarly inquiry that are important for all majors. In Area C courses, students learn to analyze and solve problems using quantitative methods and communicate effectively using language appropriate to science, math, or technology disciplines. The information gathered on the UCUES survey about what students feel they have learned in their Area C courses provides one data point in an overall assessment of the Area C learning outcomes. The survey provides a baseline measure of the student self-reported impact of Area C courses on their learning gains. Skill areas with room for improvement can be identified, targeted, and re-assessed. Understanding how students experience their General Education program more generally and what they have learned from that experience provides an additional source of information to help the campus assess the overall educational effectiveness of the program. Future studies will use a comparable faculty survey of those teaching GE courses to gather additional information about learning outcomes relevance and achievement from the perspective of the instructors.

**Political Science**

The Political Science assessment in 2014-2015 was specifically designed to operationalize the pilot assessment launched in 2013-2014 which suggested that PLOs can be reliably, validly and feasibly measured by graduate student reviewers using student assignments and coded rubrics. In the pilot assessment there was a high correlation between the content analysis by graduate students and with faculty self-reports about the level of PLO coverage in their courses. The initial work also suggested that student mastery of the PLOs increases as students takes more courses.

The operational phase, 2014-2015, was focused on identifying how to train new graduate student coders effectively, using a newly created training manual, and ensuring high inter-coder reliability. Reliability between coders was achieved in two ways: first, coding of student mastery of the assignments and second, coders were asked a set of questions surrounding the assignment, and discussed their answers until a consensus was reached about the extent in which individual assignments embodied the PLOs.

The pattern of PLO mastery for students increasing with the number of courses taken was confirmed a second year in a row. Yet because the student sample was small (although increased year two) the analysis of the relationship between student characteristics and mastery of the PLOs was deemed preliminary and suggestive. A focus group was held with senior honors thesis students to obtain feedback on the PLOs and suggestions for how they might be better introduced to undergraduates. Each graduate teaching associate and adjunct instructor was assigned a ladder faculty mentor who is responsible for reviewing the PLOs with them and assisting with PLO incorporation into syllabi. The department would like to increase the sample size and do the assessment for a third year to continue to verify the findings.