

# CURQ Web Vignettes

## Students Undertake Assessment in Capstone Experiences

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As the culture of assessment in higher education has developed, it has been noted that students, the largest stakeholders, have been for the most part left out of the process of convincing others of the value of assessment practices (Rodgers 2011). The capstone course, however, provides a place for students to develop their research skills by conducting actual research and an opportunity for them to become involved in the assessment process as researchers. The benefits of undergraduate research have been demonstrated (Brakke, Crowe, and Karukstis 2009; Kuh 2008), particularly in the areas of student learning and student engagement. The benefits of involving students as researchers in the assessment of college programs have not yet been explored. Yet students conducting assessment research can provide insider knowledge of student perspectives and, because of their relationship to their peers, have access to student viewpoints and activities that other professionals may not. When doing assessment research in a Media and Communication Studies capstone, students take on the role of professional consultants “hired” by an office or program, and they are able to see how classroom work can be applied to their own campus community. The research done in the social sciences is particularly useful for assessment work, and the results of the assessments can benefit their institutions more broadly.

I teach a senior seminar on communication and culture that focuses on ethnographic research. Students each conduct a mini-ethnography of a group or organization in order to understand the members’ perspectives, norms, and cultural patterns. I also have the students in the seminar work as a group on an assessment project for an office or committee at the college in addition to their individual projects. They learn additional information about the research process through the group project, develop their skills in working collaboratively, and learn to adapt the presentation of their findings to particular campus audiences.

Students in the course have worked on assessment projects involving such topics as how students experience the campus’s courses on diversity, diversity in the formal and informal curriculum, the campus climate as it relates to diversity, the discussion component of our first-year seminar, The Common Intellectual Experience (CIE), the summer fellows program, and student experiences and attitudes related to a particular residential area and a new policy instituted there. They have done work for the dean’s office,

the Office of Student Affairs, a faculty committee, and a team of faculty, students, and staff working on a grant from the Teagle Foundation to assess diversity on multiple campuses.

For these projects, the students met with the office or group that “hired” them in order to understand their “client’s” needs. They then designed the projects—from determining the sample, to the recruitment of participants, to the development of interview or survey questions. They conducted in-depth interviews, focus groups and/or other observations, transcribed or took field notes, analyzed the data in small groups, and gave a formal presentation and a written report of their findings. In addition to the benefits students gain from doing this kind of independent research, these projects gave students a voice in the work of the college. They came to see themselves as change agents.

The projects also fostered collaborative reflection among students, faculty, staff, and administrators, and because they were accountable to an office or committee on the campus, the students rose to the challenge, especially at the formal presentations. They were well-prepared and polished. The students learned how to frame their claims to get a hearing from an audience that included people in positions of power and people, including classmates, with very different views. For example, they presented criticisms of a program with the director of that program in the audience, and they did this without alienating her. Students’ course evaluations suggested that they appreciated seeing how this sort of research could be applied to the real world; they conducted research for real people that would have an impact and lead to change.

Of course there are challenges to be considered. This work is labor-intensive, and students are often uncertain and anxious about data collection and analysis, but this is true of researchers in general. Projects must be sought in advance from across the campus, and faculty, staff, and administrators have to be willing to respect students enough to allow them to take on the role of an assessment researcher or consultant. Inviting students into our conversations about assessment as researchers, however, can benefit everyone. 

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### **Undergraduate Research in Sociology-Anthropology Capstone Courses at Linfield College**

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Majors in sociology and anthropology at Linfield College are required to take a 400-level capstone seminar during their senior year. These seminars require that majors build on their four-year course sequence by producing original research on a topic of sociological and/or anthropological significance. It is here that students are required to demonstrate that they are not only consumers of knowledge, but also producers of knowledge. Capstone courses require that students make a conscious connection between theory and methods; therefore at Linfield students are required to complete both a course on social theory and a course on methods of social research before enrolling in the 400-level seminars.

Currently, the department offers five courses that meet the capstone requirement, each of which serves both sociology and anthropology majors. Two of these courses are offered each year. Each course has its own substantive focus, based on an area of special interest to the professor.

Every departmental capstone course is designated as a "major writing intensive (MWI)" course in Linfield College's core curriculum. This designation indicates that the course enhances "students' understanding of the formats, conventions, and habits of mind appropriate to the major's disciplinary investigations." According to the college catalogue, in MWI courses:

- Students frame key questions important to the understanding of their discipline.
- Students answer such questions in writing appropriate to the conventions of their discipline and compelling to an intended audience.
- Students develop or further refine an iterative writing process that includes prewriting activities (e.g. discussion, research, literature review), drafting, revising and editing, and writing that is appropriate for their chosen discipline.
- Students receive significant instruction and feedback helping them in the various steps of this process.

The final original research paper that is required in each course is assessed in a number of ways. The instructor, for

example, first evaluates the work as a component of the final course grade. In addition, departmental faculty members assess the work, via established rubrics, as part of the department's annual program assessment. The departmental assessment of the projects serves as a means of evaluating the degree to which each student has met the first four goals of the major, which are:

- the ability to see how individual lives are connected with wider social and cultural processes and forces;
- fundamental understanding of the relationship between theory and method in the historical context of their discipline;
- the ability to access, organize, critically analyze, and produce knowledge about humans as social and cultural beings; and
- oral and written skills for effective communication in a variety of contexts.

Finally, the manuscripts are evaluated from the standpoint of the learning objectives of MWI courses.

#### **Example of a Capstone Course**

A capstone sociology/anthropology course entitled *Self and Society* "examines the concept and notion of the self and identity through a symbolic interaction perspective, particularly on how the self is affected in a given social context." Students in the course are required to write a 20- to 25-page research paper on a topic of their choice. Various components of the paper are due throughout the semester. The project requires students to conduct original research (data collection and analysis), and participate in peer review. Three drafts of each section of the paper are written. At the end of the semester, students are required to give a formal oral presentation to the class.

The first several weeks of the course are devoted to ensuring that students have an in-depth understanding of the main theoretical focus of the course. By week three, students must identify the topic of their original research project. Once the topic is approved, students begin to work through the stages of the research process. They first write an introduction and literature review, followed by a theory and methods section. Once the research plan is approved, students begin data collection and analysis. At each juncture, students first submit their work to their peers for review, spend a week making revisions, and then submit the work to the professor for further comment. By the end of the semester, the students have completed all stages of the research process.

Conducting original research in the span of one semester is difficult and extremely time consuming. Therefore, a significant amount of course time is devoted to ongoing discussions regarding the progress of their work, conversations about the ways in which their work is connected to the substantive content of the course, and data collection (during the final weeks of the semester, students are given class time to collect and analyze data). While the course is rigorous, assessments of their projects indicate that students rise to the faculty's high level of expectations.

(Further information about sociology/anthropology capstone courses at Linfield College, including copies of syllabi, assignments, and assessment rubrics, contact [aorr@linfield.edu](mailto:aorr@linfield.edu).) 

### **Undergraduate Research and the Chemistry Capstone at Willamette University**

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In the early 2000s, our chemistry department at Willamette University restructured the curriculum and expanded the senior capstone experience from one semester to a full academic year. As students transitioned into more in-depth research proposals and projects, we recognized weaknesses in their preparation. We observed that most students were ill-prepared in experimental design, that their scientific-writing skills were weak, and that they were unable to effectively search and read the scientific literature.

To address those weaknesses, we enhanced the major by introducing a tiered structure: chemistry majors now engage in a four-year chemistry laboratory curriculum that progressively prepares them for their independent research capstone as seniors. Basic skills such as understanding the literature, scientific communication, experimental design/hypothesis testing, and data analysis are taught in two stages—first through initial introductions to the topics in lower-division laboratories and then through advanced training in upper-division laboratories.

Students in both Introductory Chemistry and Organic Chemistry laboratories learn literature and communication skills by selecting a chemistry topic or compound of societal importance, exploring the relevant literature, and presenting a poster at a campus-wide scholarship conference. Students in these two lower-division laboratories also propose and test predictions or hypotheses, and in the Organic Chemistry laboratory, they carry out a five-week, multi-step synthesis working from literature sources (as opposed to the lab manual). In the Physical Chemistry laboratory, students use Excel and PeakFit to plot data, fit the data to theoretical

equations, and compare fits to experimental results using both linear and nonlinear regression analyses.

Advanced training starts in the spring of the junior year, when chemistry majors begin a writing-centered two-semester sequence of integrated laboratory courses (Silverstein et al. 1997; Silverstein and Hudak 1994; Goodney et al. 1986; Silverstein and Kirk 2011) in one of two tracks, either chemistry or biochemistry. In Experimental Chemistry I and II, students apply instrumental analysis to physical or inorganic chemical systems. Biochemical systems are characterized in Experimental Biochemistry I and II. All four of these laboratory courses include student-devised sub-projects that last four to eight laboratory periods. By the end of these two courses, students in each track have engaged in several different approaches to experimental design and have worked with all of the major instruments (Duncan, Kirk and Williamson 2008; Goodney and Williamson 2002) in our department. (for a complete list of our departmental instrumentation, see <http://www.willamette.edu/cla/chem/instruments/index.html>).

Combining their basic skills and advanced training, students are ready to plan independent research. In the spring of their junior year, they meet with at least two chemistry professors to discuss potential research projects for their senior thesis. Majors are matched with faculty mentors by the end of the spring semester so that students can begin reading background literature and planning their senior research project during the summer.

All chemistry majors carry out their capstone experience as part of our writing-centered Senior Research Projects I and II courses. In the fall of their senior year, students draft, edit, and submit a formal research proposal in the style of a Research Corporation grant proposal. Immediately following faculty approval approximately halfway through the fall semester (when the proposals are “funded”), students begin experimental work on the project. Lab work and data analysis continue into the spring semester, culminating in a written thesis and oral presentation at an end-of-the-year symposium. Our grading rubric for the senior presentations considers prose, scientific content, and critical thinking.

In order to assess students' development over the course of the major, we have modified a critical-thinking rubric that we plan to use for assessment at four different points in the students' development: two formal reports in the Experimental Chemistry or Biochemistry courses I and II, the senior symposium oral presentation, and the written senior thesis. Comparing the assessments at these four junctures will give us a sense of how students progress in their critical-thinking skills over the final year and a half of their major.

In summary, the chemistry department at Willamette University has carefully crafted a four-year curriculum (Kirk, Silverstein, and Willemsen 2006) that prepares all chemistry majors for their required capstone research experience. Laboratories (and courses) in the first two years emphasize basic skills such as understanding the literature, scientific communication, experimental design/hypothesis testing, and data analysis. Third-year laboratories deepen training in all of the above-mentioned skills, with special emphasis on experimental design, data analysis, and scientific communication. Fourth-year students are then prepared for their capstone experience, the full-year senior research courses; here they prepare a formal research proposal and carry out and report on chemical research that is potentially publishable. 

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