Annual Assessment and Improvement (Closing the Loop) Report

The Assessment Improvement report is your annual summary of your department’s assessment and improvement activities. The template permits us to demonstrate that every department continuously makes improvements informed by faculty analyses of student performance.

Instructions

On the Assessment and Improvement template below record your department, assessment coordinator, departmental mission, and student learning outcomes (Remember, an “outcome” is the knowledge and skills your graduates can demonstrate). This information is available in your master assessment plan. Then report the assessment measure (what you did to assess student learning), what SLOs were assessed, what you found, and how you used the information to improve your program.

You need only assess 1-2 of your departmental program outcomes. Be sure to use at least one direct assessment measure. Direct assessment activities measure student performance.* They include:

- Any work in a capstone course.
- A senior level exam, paper, presentation or project that fits a program outcome.
- Portfolios of student work.
- Licensing or professional exams.
- Reports from employers, internship supervisors, etc.

*As Barbara Walvoord pointed out, student classroom performance can be verbally reported as long as it is collected in a reasonably systematic manner. For instance, a small group of faculty might look at samples of senior seminar papers and discuss strengths and weaknesses. Alternatively, faculty teaching a senior seminar might meet to share their impressions regarding where student work did or did not meet departmental standards.

Indirect assessment activities measure outcomes via self-reports or surveys. They include the following data.

- The OSR exit surveys of graduating seniors
  [http://www.wwu.edu/osr/exit surveys.shtml](http://www.wwu.edu/osr/exit surveys.shtml)

- Departmental time-to-degree data

The Master Assessment Plan template, the Annual Assessment and Improvement Template, and examples are attached below. Please do not hesitate to contact me concerning any questions you may have about these processes. I am also glad to meet with chairs, assessment coordinators, and to assist with these processes.

Sincerely,

Steve VanderStaay
Department of Biology: Master Assessment Plan

Department: Biology

Assessment Coordinator: Deb Donovan

Departmental Mission: The mission of the Biology Department is to provide an outstanding learning environment that integrates education, scholarship, and service in order to actively engage students in the biological sciences and foster their development as lifelong learners. Successful graduates of our Department will understand fundamental biological principles in depth, will have laboratory and field skills to answer biological questions, will have enhanced critical thinking and quantitative skills, will be able to communicate precisely and analytically in written and oral forms, and will be able to engage independently and collaboratively to be thoughtful and productive contributors to society.

Department Student Learning Outcomes: Upon graduation, Biology majors will

1. have in-depth knowledge from the major areas of biology (ecology, genetics, evolution, cell and molecular biology, and organismal biology) and be able to integrate principles from these areas.

2. be proficient in a variety of science practices including acquiring laboratory and field skills necessary to answer biological questions, communicating precisely and analytically in written and oral forms, and engaging collaboratively in the scientific process.

3. have effective quantitative reasoning skills.

GUR Student Learning Outcomes:

1. Use quantitative and scientific reasoning to frame and solve problems

2. Apply tools of technology, with an understanding of their uses and limitations

Student Learning Outcomes Assessed:

<table>
<thead>
<tr>
<th>Assessment Measures</th>
<th>SLOs Assessed</th>
<th>Use of the Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content assessment administered at the beginning and end of the core biology series (Biol 204-206) and at the end of the capstone course (Biol 432 – Evolutionary Biology)</td>
<td>1</td>
<td>Results of the content assessment are reviewed by the assessment committee, which makes recommendations to the faculty about programmatic change at an annual assessment faculty meeting.</td>
</tr>
<tr>
<td>Analysis of which biology courses specifically incorporate these practices and how these courses are distributed amongst the different emphases.</td>
<td>2</td>
<td>The matrix relating course number to science practice is reviewed by the assessment committee, which determines if all of our students take courses that, together, include all of the practices. The committee makes recommendations about programmatic change to the faculty at an annual assessment faculty meeting.</td>
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<tr>
<td>Topic</td>
<td>Page Numbers</td>
<td>Description</td>
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<tr>
<td>Alumni survey</td>
<td>2, 3</td>
<td>Results of the alumni survey are reviewed by the assessment committee, which makes recommendations to the faculty about programmatic change at an annual assessment faculty meeting.</td>
</tr>
<tr>
<td>Faculty survey of students’ quantitative skills</td>
<td>3</td>
<td>Results from the faculty survey indicated that we think our students struggle with several critical skills including (but not limited to): manipulating exponents; interpreting graphical information; manipulating fractions, proportions, and percentages; and understanding the size of numbers. These are the skills we decided to target in the core biology classes.</td>
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<tr>
<td>Pre- and post-assessments of quantitative skills in core biology classes.</td>
<td>3</td>
<td>Data on the results of the targeted practice in the three quantitative skills identified by faculty are currently being collected and analyzed by a graduate student. She will report her findings to the faculty with recommendations about improving quantitative skills in our students.</td>
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Department of Biology: Assessment and Improvement, 2014

**Department:** Biology

**Assessment Coordinator:** Deb Donovan

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<td>Pre- and post-assessments of quantitative skills in core biology classes.</td>
<td>3</td>
<td>Students in one class (Biol 205) got targeted practice of four quantitative skills as part of their lab experience: manipulating exponents; interpreting graphical information; manipulating fractions, proportions, and percentages; and understanding the size of numbers. The assessment of this study was completed this year and the results were presented to the faculty at a seminar during Fall quarter. We found that the limited targeted practice during lab was not enough to increase the students’ quantitative skills. However, the results indicated that targeted practice that is graded and more directly linked to course content could be more effective. The faculty discussed how we could formally incorporate practice of quantitative skills into our courses.</td>
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<tr>
<td>Pre- and post-assessments of student achievement and attitudes towards learning science in a class incorporating active-learning pedagogies.</td>
<td>GUR-1</td>
<td>We found that students in a “flipped,” student-centered Biology 101 class that incorporated active-learning pedagogies had significantly better content knowledge and more sophisticated views about learning science compared to students in a more teacher-centered class that incorporated fewer active-learning pedagogies. While this study was completed in Biol 101, the results apply to all Biology classes in which active-learning pedagogies are being incorporated. The results of this study were presented at the 1st annual Slesnick symposium during Spring quarter.</td>
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Program Changes Based on Assessment
The Biology Department is in the midst of a deliberate change in the way we teach science. The two studies (outlined above) that were part of our assessment efforts this year represent a systematic evaluation of incorporating active-learning pedagogies into our classes, with the intent of increasing student content knowledge, quantitative skills, and understanding of the scientific endeavor. Faculty members who attended the seminars at which the results of the studies were presented have been motivated to incorporate active-learning strategies into their classes. Many of us will continue to do this in professional learning communities as participants in the NSF-funded Change at the Core grant, for which our department chair is a co-PI.

The department also devoted five faculty meetings to studying the recommendations recent report Vision and Change in Undergraduate Biology Education from the American Association for the Advancement of Science. This report, published in 2010, outlines core concepts for biological literacy, core competencies and disciplinary practice, and advocates for student-centered classrooms using active-learning pedagogies. It is being used by Biology Departments across the nation to guide reform efforts. We reviewed each of the courses required for all our majors (Biol 204, 205, 206, 321, 323, 325, and 432) to determine the extent to which we are addressing the core concepts and core competencies that are recommended in Vision and Change. We discovered that we have a major gap in content coverage of developmental biology in all required courses and a gap in coverage of physiology in the 300-level courses. In the fall, we will be reviewing the courses in which more developmental biology could be covered to see if we can ‘make room’ for it by eliminating other content and to determine how we can do a better job covering physiology in the upper division. In terms of core competencies we need to do a better job in educating students in how to use modeling and simulation, in communicating and collaborating with other disciplines, and in understanding the relationship between science and society. We began to discuss strategies to address these deficiencies in core competencies; this discussion will continue in the fall.