BS Biological Sciences 2020-21 Learning Outcome Assessment Report

Learning Outcome 1 – Understanding of Evolution

Methods

We assessed students' understanding of the core concept of evolution using the final grades assigned in the capstone course in Biological Sciences, BIO 4200 (Evolution). All final grades from the course taught in Spring/Summer 2020, Fall 2020, and Winter 2021 were utilized for this assessment. Letter grades were pooled across all semesters, and the percentage of students exceeding the minimum criteria to demonstrate an understanding of the concept (B- letter grade) are reported here.

Results

During the assessment period, 115 BS students successfully completed BIO 4200, and 96% of those students (110 students) completed the course with a B- letter grade or higher. Notably, only one student earned a grade of D+ or worse (1%), which is considered failing in the Department of Biological Sciences. These values represent an improvement over the 2019-20 assessment data (86% with a B- letter grade or higher and 1% failing), and meet our stated goal of 75% of students earning a grade of B- or higher. As before, we note that most students that enter BIO 4200 are within a year of graduation, such that success in the course is typically higher than expected. This assessment represents the last year that we will use "Understanding of Evolution" as a Learning Outcome; the LO itself is too broad to help us fine-tune our curriculum and the entire course grade from Bio 4200 is not sufficient to assess the LO.

Learning Outcome 2 – Scientific Communication

Methods

We assessed students' mastery of written communication in Biological Sciences using a term paper assignment common to the three 4000-level writing intensive courses within the department (BIO 4110: Biomedical Technology and Molecular Biology, BIO 4120: Comparative Physiology, and BIO 4130: General Ecology). Each course requires multiple writing assignments that require revision, and the final term paper assignment is graded using a rubric common to all three courses. We used the distributions of the points earned for the final term paper based on the rubric to assess students' mastery of written communication in the biological sciences. The proportion of students meeting or exceeding the minimum criterion of 80% of the rubric points (56 of 70 points) is reported here, with our stated goal being 80%.

Results

In the 2020-21 academic year, we assessed 51 students earning a BS in Biological Sciences who completed one of the writing intensive courses, and 90% of these students scored at least 80% of the points on the rubric for the final draft of their term paper in the writing intensive courses. This proportion well exceeds our stated goal of 80%. Notably, 76% of the students

scored at least 90% of the rubric points, and 29% scored 100% of the points. Five of the 51 students (10%) scored fewer than 80% of the rubric points on the term paper assignment.

2021-22 Action Plan

As a consequence of the 2020-21 assessment results, three actions are planned for the 2021-22 academic year:

1. Continued emphasis on scientific communication. In revising our undergraduate curriculum this year, the faculty agreed to maintain an emphasis on scientific communication, but to expand it beyond the three writing intensive courses and beyond writing alone. Efforts will need to be undertaken to develop a rubric that can be used to assess scientific communication other than writing across many more courses.
2. Develop assessment methodology for new Learning Outcomes #2 (interpreting quantitative data) and #5 (experiments).

Timeline for Action Plan

A timeline for the implementation of the action plan for the 2021-22 academic year follows:

1. Continued and improved emphasis on scientific communication will be assessed using writing and oral assignments in multiple courses (at formative and advanced levels) rather than the writing-intensive courses alone. Curriculum revision has designated multiple courses as scientific communication courses in the department, and standardized rubrics will be developed for assessment. Rubric development will occur prior to the Fall semester.
2. Courses at the introductory, intermediate, and advanced levels will be identified that include quantitative interpretation to be used as assessment. Likewise, lab courses will be identified for the assessment of Learning Outcome #5; upper level lab courses are now required for the BS degree in the department, and these approved courses will form the basis for the assessment. Standardized rubrics for assessment will be developed for both LOs prior to the Fall semester.