

Biology and Marine Biology Undergraduate Education Assessment 2020-21

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Overview

The Biology Department has previously engaged with institutional data around course completion and graduation rates, directly assessed upper-level student learning outcomes in the area of molecular biology (2016-2017), and directly assessed general biology learning outcomes before and after the General Biology and Honors Biology introductory course sequences (2018-2019). Previously, faculty expressed interest in continuing use of the general biology assessment instrument (GenBio-MAPS, Couch et al, 2019), particularly among graduating Biology majors, for which it has also been shown to be a reliable and valid instrument. The logistics for assessing graduating students is more difficult since students complete their coursework with a variety of upper level courses. Due to the disruption and additional burdens of the pandemic, we concluded we would not pursue direct student assessment at this time and instead focussed our efforts on our teaching and peer review of teaching, an important indirect assessment. Our goal was to create and implement a robust system for the peer review of teaching in order to improve teaching quality and student educational experiences. In the future, we hope to take a holistic approach to undergraduate assessment that considers various data sources to better understand our students' learning, experiences in our courses and major, and will allow us to make evidence-based curricular decisions going forward.

Changes to Biology's Peer Teaching Review

At a Biology faculty meeting in January 2020, Sierra Dawson, Associate Vice Provost Academic Affairs, presented an overview of the University's new criteria for teaching evaluation which includes the student experience surveys, instructor reflection, and peer review. The criteria for evaluation centers four pillars of excellence: Professional Teaching, Inclusive Teaching, Engaged Teaching, and Research Informed Teaching. These new criteria were the basis for the formation of a new Biology Peer Teaching Review Committee.

The peer teaching review committee started their work this year with a couple of questions: (1) how was peer review of teaching working or not working, and (2) how do we align our departmental process to new evaluation criteria? They addressed the entire review system and protocols for conducting reviews and arrived at the following considerations:

- Equity in peer assignments, who should complete reviews?
- Building teaching community and curriculum coherence
- Protecting faculty time
- Transparency and objectivity
- Reviewee agency
- Providing frank constructive feedback to improve teaching

The peer teaching evaluation committee proposed several procedural changes to improve the peer teaching review process:

1. Expand the reviewer pool beyond research institutes and include NTTF for TTF reviews.
2. Assign reviewers with the goal of a mix of closer/further content experts.
3. Assistant professors should complete peer teaching reviews of other faculty two times pre-tenure; all other faculty should complete a peer teaching review annually.
4. Make reviewer assignments as early in the academic year as possible.
5. Create an Observation Guide to serve as candid feedback and evidence of teaching excellence for the reviewer. The guide includes prompts for context, engaged teaching, professional teaching, inclusive teaching, and research-led teaching. Citations for research basis are included. Evidence of every item in the observation guide is not expected. The

Guide specifically prompts reviewers and reviews to attend to Biology Department, course-level, and class level learning objectives.

6. Provide a peer teaching evaluation letter template and sample letter.
7. Provide FAQs as a resource.
8. Establish review protocol: conduct review using observation guide, class observation, syllabus, exam, and assignment; coordinate with the reviewee before observation and debrief after with the Observation Guide; reviewer completes evaluative letter; reviewer/reviewee both sign the evaluative letter.
9. Send the review protocol to reviewer/reviewee pairs.

Development of these materials and protocols were made iteratively over the course of the year with cycles of faculty pilot testing, feedback and revision. On April 3, 2021, Nicola Barber, chair of the Biology peer teaching review committee gave a department-wide presentation on Biology's peer teaching review process and changes implemented by the committee. Five documents were distributed: (1) a copy of the presentation slide deck, (2) the Observation Guide and Protocol, (3) a template evaluative letter, (4) a sample evaluative letter, and (5) FAQs.

Future Directions

The work on peer review of teaching raised several possible future directions to enhance our undergraduate student experiences and department teaching. The attention to learning objectives in the peer review observation guide raised possible coordination with the curriculum committee to revisit our learning objectives-based curriculum map. One possibility is for the peer review process to iteratively update this document with our latest course offerings, and current learning objectives that align to national priorities for undergraduate biology education outlined in Vision & Change (AAAS, 2011). Conversations between the Department Head, curriculum coordinator, and assessment and peer review coordinator also raised the possibility that future undergraduate education assessment could involve faculty reengaging with the department and CAS data on student success and retention (prepared annually by Institutional Research), along with new department-wide student experience survey results, that taken together would help us better understand current undergraduate educational experiences.

References

Couch, B. A., Wright, C. D., Freeman, S., Knight, J. K., Semsar, K., Smith, M. K., ... & Brownell, S. E. (2019). GenBio-MAPS: A programmatic assessment to measure student understanding of vision and change core concepts across general biology programs. *CBE—Life Sciences Education*, 18(1), ar1.

American Association for the Advancement of Science (AAAS). (2011). Vision and change in undergraduate biology education: A call to action, final report. Washington DC. <http://visionandchange.org/files/2013/11/aaas-VISchange-web1113.pdf>

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