

Final Report - Office of Assessment and Accreditation

Proposal title: Increasing course structure and alignment in General Biology I

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Overview of completed work: The goal of this project was to work on the alignment of five of my teaching modules in Biology 2120. I took five existing course modules, and made sure the in-class activity and summative assessment were aligned with the learning objectives. In addition, I designed new practice quizzes and exam questions that focused on helping students make connections between class content and their own life and career goals.

a. Describe what you learned

One of my major goals for Biology 2120 is to help students connect what they are learning to real-world examples and their own lives. One of the biggest things I realized in doing this alignment work with Dr. Singer-Freeman was that I was not actually testing them on this. Several of the modules that I worked on included case-studies, the purpose of which were to help students see the importance of the biological concepts they are learning. Before this work, I would then test the students on whether they understood the specific real-world application that we covered within the case study. However, I was not testing if they could make these connections on their own or see new connections. In my work through this grant, I learned how to use assessment to help students link course content to their own lives and to the real-world on their own.

One of the other major takeaways from this work was how important wording is in assessment questions. When reviewing my assessment questions I found that many needed to be simplified, so that students were not missing the questions just because of reading comprehension. With the new reflective questions wording was also very important. Specifically, I needed to give students enough detail so that students knew exactly what they needed to provide in their answer to get full credit. This was done by creating rubrics that the student could see while they were answering the questions on the practice exams or exams.

Lastly, I also was reminded how important it is to go back and check the alignment between your learning objectives and exam questions. I often modify in-class activities, and change up assessment, and I need to make sure to keep my learning objectives in mind as I make these changes.

b. Describe how this will be incorporated into your instructional practice or curriculum

The five aligned modules with practice quizzes, and reflective exam questions were incorporated into BIOL 2120 in the Fall of 2020. I will continue to develop and use these types of assessments in BIOL 2120, but also my other biology courses. A sample question and the general rubric we created for the reflective assessment question can be seen below:

Sample Question:

1. Types of Chemical Bonds

- A. In your own words describe three different types of chemical bonds.
- B. One of today's learning objectives is to "Explain how the structure of water molecules relates to water's unusual properties". Explain how chemical bonds relate to this learning objective.
- C. Describe one example that shows why understanding different types of bonds is important to you as a biologist.

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Understands concepts - Correctly describes <i>topic or multiple topics here</i> .					
Accurately links concepts to learning objective - Provides a clear and accurate explanation of <i>biological topic being covered</i> relates to learning objective.					
Broader importance - Clearly describes one application of <i>biological topic being covered</i> .					

c. Describe the student impact (good, bad, or indifferent)

Overall the new practice tests paired with the reflective exam questions were received very well by the students. The first one they did was an ungraded practice exam and it was really surprising to see how poorly some of them did especially the part where they needed to explain the broader importance of what they had learned. Even though we had covered multiple real-world applications of the topics in class, they had a hard time taking a step back and making the connection between the content and an application. However, in using these weekly reflective practice exams along with the reflective exam questions, they got better at this throughout the semester. You can see this in the example below.

Example of a “Broader importance” answer from early in the semester:

“One "real world" example that shows why understanding different types of bonds is important to me as a biologist is the human body and all of its critical aspects like homeostasis and response to stimuli.”

Example of a “Broader importance” from the same student later in the semester:

“Understanding cellular respiration will help a scientist or doctor detect or even improve on treatment for Cyanide. As we discussed in the course, the autopsy results of the seven deaths due to cyanide listed hypoxia as a cause of death. But understanding cellular respiration would show the inconsistency between the cause of death-hypoxia and the high oxygen level in the blood. When Cyanide inhibits complex VI, the amount of oxygen is irrelevant and even artificial respiration will not be helpful to the person(s).”

As you can see from these examples, at first the student’s answer is pretty vague, and does not suggest an actual application. However, in the second answer, they give a much more detail, and an actual real example of how biological knowledge was used in the real world to solve a problem.

d. Describe what you plan to do differently, if anything

I would like to add in some peer feedback on the practice exams. I think this will help students see other student’s examples, and give them more ideas of why what they are learning really matters. I would also like to do some polling of my students to see if this positively affects their view of learning about biological topics.

I do plan to expand this effort creating more of these types of questions in BIOL 2120 and other courses. In addition, I need to modify some questions to give students clearer guidelines so they know how much detail they need to give. I would also like to try to add in more work in-class work where students get to explore applications of the biological concepts they are covering.