

Teaching and Learning Project Assessment Report

BioSc 5 Health Biology

Fall 2006

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What we wanted to learn about our students:

Students take BIO 5 to satisfy the health requirement for the Associated Arts degree. Title V requires that degree-applicable courses have student learning outcomes that “reflect critical thinking and the understanding of application of concepts determined by the curriculum to be at college level”.

The course outline for BIO 5 has a variety of course objectives related to critical thinking. Biology instructors participating in this assessment project chose to examine students’ abilities to use course information to analyze lifestyle decisions and develop plans for improving personal health.

This project is part of a series of projects on the assessment of critical thinking in the General Education Program at LMC. It will be included in the institutional portfolio on assessment of student learning at the degree-level.

What we did:

Three of the five instructors teaching BioSc 5 in Fall 2006 met for a total of nine hours during the semester. A fourth Biology instructor, who previously taught BioSc 5, also participated.

The group chose to focus on an end-of-course paper that requires students to use course concepts to analyze the health implications of aspects of their lifestyle and develop a plan to improve their health. Each instructor had a unique version of the assignment. The assignments differed in focus and required students to use different types of information in their analysis of personal health. One of the assignments required students to draw conclusions about their health based on a series of labs in which they collected personal data such as blood pressure. Another assignment required students to read a chapter on nutrition that had not been discussed in class and use information in this chapter to analyze their diets. A third assignment gave general suggestions for using information from the labs, family medical history, or personal issues such as depression or drug use. The actual assignments are appended at the end of this report.

To assess student work for the purposes of this project, the group collaboratively developed a rubric. The instructors also voluntarily opted to use the rubric, or a customized version of the rubric, to grade all of their student papers, though some added additional criteria such as organization or effort. The general rubric is attached to the end of this report.

To prepare students for these assignments, all of the instructors gave students the rubric. One instructor facilitated a 15-minute class discussion of the rubric with special attention to the embedded examples that distinguish A/B-level work and C-level work. Another instructor divided the class into groups and asked students to compare and contrast the descriptions of the different grade categories. A third instructor used both group and whole class discussion to focus students on tasks related to understanding the assignment; students were asked to summarize the required tasks, list questions or concerns, develop tips for doing the assignment, and identify useful or exciting aspects of the assignment. One instructor required students to discuss a first draft of their paper with a writing

consultant in the Reading and Writing Center; students received 10 out of the total of 50 points for the paper by turning in their first draft and a form containing the writing consultant's comments. This instructor gave a copy of her assignment and rubric to the Coordinator of the Reading and Writing Center who made sure that writing consultants had access to both.

Instructors felt that these activities were successful in achieving the following goals:

1. motivating students to think about (and hopefully start working on!) the paper several weeks before it was due;
2. helping students understand the requirements of the assignment;
3. encouraging students to some extent by convincing them that the goals of the assignment are concrete, specific, and "doable";
4. communicating the instructors' expectations and grading criteria.

At the end of the semester the group assessed a random sample of 31 student papers from five of the seven sections of BioSc 5. Each instructor contributed 10-11 student papers. For each version of the assignment, we conducted a benchmarking exercise in which each instructor assessed the same paper using the rubric. We then discussed the scores and reached consensus. Papers were then evaluated independently by two instructors based on the rubric. If the two assessments differed, a third independent reader analyzed the paper and the closest two assessments were averaged.

What we learned about our students:

Results:

	Low (D or F)	Proficient (C)	High (A or B)
% out of the sample	4/30 = 13.3%	7/30 = 23.3%	19/30 = 63.3%

Based on the rubric criteria and notes written by instructors when assessing this sample of student work, we can make the following observations:

63% of the students identified a variety of factors affecting personal health and discussed these factors with a level of accuracy, precision and depth that demonstrated a good understanding of BioSc 5 concepts. These students were able to generate a plan for improving their health that was specific, realistic, and addressed issues from the analysis of their health. Relative to B-level papers, A-level papers demonstrated an understanding of why factors affected health. The analysis was thoughtful and showed that the student had "processed" the information into a meaningful reflection on personal health.

23% of the students addressed the requirements of the assignment by listing relevant health factors but their discussion did not demonstrate an understanding of the BioSc 5 concepts underlying these factors. Their analysis of their own health was sketchy or contained inaccurate or illogical statements and did not clearly connect course content to personal health. They developed a plan for improving their health, but the plan was general and lacked references to course information. For these students, it was difficult to discern if the course had impacted their understanding of their own health.

13% of the students submitted work that either failed to address the goals of the assignment or was largely illogical and inaccurate. If a plan for improving personal health was given, it did not address points discussed in the analysis of personal health.

Relating this analysis of student work to the Foundation for Critical Thinking framework:

In January 2007 LMC sponsored a flex workshop by Dr. Gerald Nosich, in which a framework for understanding and evaluating critical thinking was presented. The Elements of Thought and Intellectual Standards discussed by Dr. Nosich are related to some of the general observations made by the BIO 5 group about weaker student performance.

Elements of Thought	Intellectual Standards	Our observations about weaker papers
Purpose	Clarity, logic	rambling discussion that loses sight of the purpose of the assignment
Information, data, observations, facts	Accuracy, precision, relevance, significance	sketchy use of course information, inaccurate statements about course content, inclusion of irrelevant info
Concepts	Accuracy, depth	sketchy discussion does not demonstrate an understanding of course concepts; little demonstrated understanding of WHY a factor is important to health
Implications Consequences	Relevance, significance	little evidence of understanding how course content connects to personal health; plans for improving health are too general

What we plan to do next to improve student learning:

1. Revise assignment prompts

For spring 2007, instructors plan to revise their assignment prompts and provide a written rationale explaining the purpose of the changes.

2. Require use of the Reading and Writing Center

Most of the papers in the sample from students who were required to use the Reading and Writing Center were noticeably better organized and contained less extraneous material. Is this due to the use of the R&WC or to this instructor's detailed assignment prompt? This instructor has extensive prior experience with BioSc 5 and has always given detailed prompts for the paper, but this is the first semester she has required that students use the R&WC. She felt that overall student papers in both of her sections were significantly better than in the past semesters when she did not require use of the R&WC. It is important to note that writing consultants help students focus on the requirements of the assignment first and foremost, then they work on logic, organization and paragraph development. So instructors should not expect to see improvements in students' spelling or grammar, unless the student makes several appointments for one paper.

For spring 2007, instructors decided to require their students to make an appointment in the Reading and Writing Center to get feedback on a first draft of their paper. Points will be awarded for providing evidence of the R&WC consultation. If the R&WC is not open on Saturdays, the instructor of the Saturday class will not make this a requirement.

3. Create a resource guide for BIO 5 instructors that contains course-specific information on critical thinking, sample assignments and rubrics, contact info for speakers, etc.

4. Develop more opportunities for students to practice critical thinking during class

For spring 2007, instructors plan to develop and document activities that incorporate aspects of the Foundation for Critical Thinking framework and that fit their individual teaching style as well as the format of their section (3 hour block vs. one hour block).

Examples:

- At the beginning of class, replace the instructor's review of previous class topics with questions that require students to paraphrase previous key concepts or issues;
 - Use Dr. Nosich's SEEI technique (State, Elaborate, give an Example, Illustrate) during class and on exams;
 - Stop periodically during a lecture and give a pertinent multiple-choice question for students to ponder individually and then discuss briefly with a classmate;
 - Give a few minutes at the end of class for a classroom assessment technique that asks students to anonymously identify a topic that they understood, a topic that they didn't understand, or a question they have. Categorize responses and use results to inform the opening lecture/discussion for the next class.
 - Group activities that require students to explain a concept and its implications for health.
5. Analyze two types of student work in spring 2007 to assess critical thinking skills:
- End-of-semester personal health papers (with revised prompts and rubrics)
 - Short answer exam questions that require students to SEE (state, elaborate, and give an example)