Course-Level Assessment Project
Final Report

To complete the Final Report, type your responses to the prompts below. Share a copy of the document with your supervisor and the Associate Provost of Assessment and Institutional Effectiveness.

Faculty Name(s): **Lena Garrison**
Division/Department: **Sciences**
Course Assessed: **BIOL 211 Anatomy & Physiology 2**

Step 1. Define

Explain the purpose or rationale for assessing the selected course.
Identify which course objective(s) were assessed. Briefly explain why you selected these course objectives for assessment.
Identify to which program goal(s) selected course objective(s) align. **This is not a Gen Ed or program course**

CLO 1 Explain the relationships between structure and function in the body systems studied in this course.
CLO 2 Identify the microscopic and macroscopic anatomy of the structures involved in the body systems studies in this course.
CLO 3 Explain the normal physiological functions of the body systems studied in this course.
CLO 4 Describe how all the different body systems function together to maintain homeostasis.
CLO 5 Describe how various health care tools are used in the examination and diagnosis of pathological conditions.
CLO 6 Explain the signs and symptoms of various pathologies by using appropriate anatomical and physiological information from this course.
CLO 9 Apply the results of appropriate calculations to interpret various types of physiological data.

Step 2. Design

Describe the instrument (project/assignment) used to assess identified course objective(s).
What benchmarks and/or controls were established?
Explain how the assessment instrument was externally reviewed and validated.

CLO 2 was assessed using both student scores on the **practical portion of Lab Tests** and using the scenario questions as described below for CLOs 1-6 & 9.

CLOs 1-6, and 9 were assessed **using unit tests and a comprehensive final**. One or two shared patient-based scenarios with accompanying multiple-choice questions (4-6) were used for each major unit (blood, lymphatic, heart, blood vessels, urinary, respiratory). As the assessed CLOs cover both a Bloom's level of 2 and 3, the multiple-choice questions associated with each scenario were distributed accordingly during the design phase. Each scenario question was mapped both to the CLOs and to Bloom's taxonomy. The major units listed above were reassessed on a shared comprehensive final using new scenarios, but covering the same units.

Step 3. Implement

Explain how the assessment was implemented.
Did any unexpected challenges arise in implementing the assessment?

Prior to the fall semester, a virtual meeting was held with all adjuncts to explain the equitable implementation of the assessment scenarios.

- Students in all sections were required to memorize the same calculations and reference values (e.g. calculating cardiac output and knowing the normal hematocrit range for men and women).
- Students practiced applying course information to patient scenarios through shared lab experiences.
- All instructors implemented a stepwise scoring for the scenario section of exams such that the questions counted for only ¼ value on exam 1, ½ value on exams 2 & 3, and then full value on Final.

Instructors were given a document containing the scenario questions broken down by units, as well as a document that contained the answers, CLO tags, and Bloom's tags. Each instructor embedded those questions on their appropriate lecture test. After student exam scantrons were scored by the instructor, an item analysis sheet was run. The item analysis was then sent to the lead instructor and the results recorded in an Excel workbook.

In the fall semester, there were issues with 2 of the questions on Exam 1, and 1 of the questions on Exam 2 (scenario missing some information, miskey, missing correct answer choice). Those questions had to be thrown out in the fall. A corrected version of all questions was used in the spring semester.

Step 4. Analyze

Explain the data that was collected and how the data was analyzed.
To what degree did students meet the established benchmarks?
Consider intention of learning activity and assessment as compared to results.

For each question on an exam, the % of students with a correct answer in a course section was recorded. Since class sizes were vastly unequal (e.g. section 65 had 6 students and section 02 had 22), a combined course average was then calculated by weighting each section by the number of students taking the exam. The weighted course averages were then used to create pivot tables analyzing outcomes for each of the questions below.

The **benchmark set for success of BIOL 211 students on a given parameter was 70% correct**. This potentially lower than expected benchmark was chosen because data from the Human Anatomy & Physiology Society (HAPS) indicates a success rate in A&P 2 of only 50-60%, with success being defined as earning a 70% or better – the requirement for admission to most programs (Forgey, Williams, & Pribesh, 2020).

Question 1: How successful are BIOL 211 students on each of the major course unit material?

Unit Topic	% Success Unit Exams	% Success Final Exam
Blood	51	58
Heart	60	65
Vessels	50	65
Urinary	50	71
Respiratory	42	58

The above data shows that students improved between first exposure to the material and the comprehensive final at the end. Two possible conclusions can be drawn from this. One is simply that weaker students had withdrawn by the final. The other conclusion is that students improved in ability over the course of the semester and retained information between its introduction in a unit and the end of the course. To tease out the effect of withdrawals on

final exam results, we could, in the future, run a secondary analysis that removes unit exam scores for any students withdrawing.

No unit level benchmarks were met for unit exams. Although, the benchmark was met on the urinary unit in the final, with the heart and blood vessels approaching the benchmark. Information in the course builds upon itself, structures and physiological processes learned in the early units support content in later units. One likely interpretation of this data is that students need the repeat to succeed.

Question 2: How successful are BIOL 211 students on each of the course outcomes?

Course Outcomes	% Success Unit Exams	% Success Final Exam
CLO 1	41	74
CLO 2	70% on lab tests	76% on Scenario Questions
CLO 3	44	62
CLO 4	37	51
CLO 5	51	67
CLO 6	50	69
CLO 9	60	60

As with Question 1, the data shows that students improved, sometimes significantly (e.g. CLO 3) in mastery over the course of the semester. By the final, the benchmark was attained for CLOs 1 and 2 and was very close for CLOs 5 and 6. The remaining CLO benchmarks were not achieved. Again the most likely scenario is that students benefit significantly from the repeated exposure and practice with the material over the course.

CLO 4, describing the interrelationship of body systems in maintaining homeostasis, requires the highest level of thought and factual retention. Each unit has an intense amount of factual information to memorize and recall, while at the same time being able to apply that information to the functional interrelationship within that unit's system. CLO 4 has the students go an additional level of understanding as they retain information from two systems, keep that information mentally organized and correctly categorized, while then also being able to pick the appropriate pieces out of each system to address the homeostasis regulation connections/interactions. That is a very tall order for most students. Factor in today's students' anxiety levels and decreased bandwidths, and for some it is most likely an unattainable goal in one semester.

Question 3: How successful are BIOL 211 students on Bloom's level 2 and 3 questions?

Bloom's Level	% Success Unit Exams	% Success Final Exam
Bloom's 2	48	51
Bloom's 3	52	68

The data shows that students are better at the higher Bloom's 3 level of applying knowledge to patient situations (almost meeting the 70% benchmark on the final) than they are at the Bloom's 2 level of demonstrating an understanding of facts. Two conclusions come to mind with this data. One is that students connect better to what they perceive as relevant and interesting problems to solve. Another conclusion is that Bloom's 2 questions rely on the student recalling and differentiating smaller units of factual information. Bloom's 3 questions are frequently at a broader picture level which can be grasped with less retention of specific facts.

Question 4: How successful are BIOL 211 students at performing calculations?

Type of Exam	% Success
Unit Exams	65%

Final Exam	60%

When asked "What do incoming nursing students need more work with?", one recurring answer from nursing faculty is "math." In every unit students memorize formulas, learn how to apply them, and learn how to interpret their results. A 65% on the unit tests is close to the benchmark. The final exam results cannot really be used, as that exam only had two calculations. Student time to take the exam was offset by an increased number of questions and reducing the number of math questions helped with the necessary time to answer the extra questions.

Step 5. Modify/Maintain

Based on analysis of data, describe changes made to the course and/or course materials.
Summarize the results of implementing changes, re-administering the assessment, and collecting and analyzing new data.

To date no course changes have been made. The unit and final exams were readministered in spring semester with the appropriate corrections. Data from spring semester unit and final exams is currently being collected and will be analyzed using the same weighted course average calculation and pivot table displays as was done with the fall data.

In June, BIOL 211 faculty will meet to discuss the compared results. Questions that will be explored in that meeting include:

1. Are the test questions too challenging? Are they really a Bloom's 2 and 3 or are they a 3 and 4 or 5?
2. The majority of students describe poor testing and text anxiety – should another measure of student success be used or added?
3. Do major curriculum changes need to occur? If so what?
4. Do students need more holistic mental and life tools and is there a way to help with that and still stay on track with the required foundational content for program transfer?

Final Results and Recommendations

- Compare fall and spring semester results
- Meet as a team and discuss the 4 questions above
- Have nursing faculty go through the assessment questions and vet them

Forgey, S.B., Williams, M.R., Pribesh, S. (2020). Pathways to success in anatomy and physiology at the community college: The role of of prerequisite courses. *The Community College Enterprise, 26(1*), 9.26. https://www.schoolcraft.edu/cce/search-archives/414

Supervisor Signature: *Raza Khan, Ph.D.* Date: *May 1st, 2024*

Please forward a copy of the signed report to the Associate Provost of Assessment and Institutional Effectiveness.