

- **Title and summary / description of your project**

My final Faculty Fellows project was a slight shift from my original proposal in May 2022. In my original proposal, I intended to develop a department-specific guidance document on how to best utilize and interpret FCQ data as part of our Quality Teaching Initiative plan. After further reflection and discussions with our faculty, I discovered our Department would rather put more emphasis on more individualized measures of evaluation and assessment (e.g., surveys, pre-post tests) than on campus-wide FCQ data. For these reasons, I shifted the focus of my Faculty Fellows project to developing a more comprehensive, three-year assessment plan of our undergraduate program. Such a plan will be important for evaluating the effectiveness of undergraduate program, and will be included in our next Academic Review and Planning submission.

Title of new project: Three-Year Student Learning Assessment Plan in Integrative Physiology

- **Describe the challenge you addressed in your department with this project.**

Faculty in the Department of Integrative Physiology (IPHY) have spent the last 15+ years developing student learning outcomes (SLOs) that define what students should be able to do upon completion of an individual course. However, we had yet to develop a set of program learning outcomes (PLOs) that define what students are expected to do, know, or develop as a result of the undergraduate degree program. Furthermore, we were missing a long-term strategy for evaluating student learning and identifying areas for curricular improvement.

- **Describe desired result.**

The goals of my final Faculty Fellows project were threefold:

1. *To develop program learning outcomes (PLOs) of our undergraduate curriculum that are specific, realistic, and measurable.*
2. *To create a curriculum map of these PLOs mapped with our required courses and the CU Boulder Baccalaureate Learning Goals.*
3. *To develop a schedule of how/when each PLO will be assessed/reported. At least one PLO will be assessed/report each year, and all PLOs will be assessed/reported over a three-year cycle.*

- **Describe the project. What did you do?**

IPHY's student assessment plan will occur over a four-year period with the *development* of a plan occurring in the first year (AY 22/23) and the *implementation* of the three-year plan occurring in years 2-4 (AY 23/24, AY2 4/25, and AY 25/26).

- Year 0 (Assessment Planning): Development of three-year assessment plan
  - December 2022: Developed set of PLOs with IPHY faculty
  - February 2023: Developed curriculum maps of PLOs
  - April 2023: Initial draft of assessment plan
  - May 2023: Final draft of assessment plan
- Years 1-3 (Implementation of Assessment Plan): Data collection and reporting
  - Ongoing: Data collected and analyzed in accordance with assessment methods
- After the four-year assessment process is complete, the assessment cycle repeats

- **Describe the outcome. What worked, what didn't work, lessons learned.**

During the assessment planning phase, I was able to achieve all three of my desired goals.

1. *To develop program learning outcomes (PLOs) of our undergraduate curriculum that are specific, realistic, and measurable.* At the end of the project, we developed six PLOs that reflected what IPHY faculty want students to be able to do and achieve at the end of the major.

*Table 1. IPHY Program Learning Outcomes*

Program Learning Outcomes (PLO)	
1	Demonstrate a mastery of core anatomical and physiological concepts.
2	Apply knowledge of the human body to new and real-world contexts.
3	Extract meaning from visual representations of data (e.g., graphs, tables, images).
4	Synthesize ideas and concepts from multiple sources to create a more comprehensive understanding of integrative physiology.
5	Apply the scientific method to questions related to integrative physiology.
6	Demonstrate effective communication and collaboration skills.

2. *To create a curriculum map of these PLOs mapped with our required courses and the CU Boulder Baccalaureate Learning Goals.* The two tables below represent our PLOs mapped alongside our four required courses and the 11 CU Boulder learning goals.

*Table 2. Curriculum map of what level a PLO is addressed in our four required courses (1=Introduced, 2=Reinforced, 3=Emphasized).*

REQUIRED COURSE	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
IPHY 3280 - Intro to Data Science and Biostatistics			3		3	
IPHY 3410 - Human Anatomy	1	1	1	1		
IPHY 3430 - Human Physiology	2	3	2	2		
IPHY 3435 - Physiology Lab	3	3	3	2	3	3

*Table 3. Curriculum map of how our program connects its work with campus learning goals. Note: It is not typical that all PLOs will align with all 11 CU Boulder baccalaureate learning goals.*

CU Boulder Baccalaureate Goals	Critical and Creative Thinking	Communication	Ethical Reasoning	Inquiry	Evidence-Based Analysis	Information Literacy	Cultural Diversity	Team work	Problem Solving	Lifelong Learning	Civic Engagement
<b>PLO 1</b>											
<b>PLO 2</b>											
<b>PLO 3</b>	X										
<b>PLO 4</b>	X										
<b>PLO 5</b>	X			X	X	X			X		
<b>PLO 6</b>		X						X			

3. To develop a schedule of how/when each PLO will be assessed/reported. At least one PLO will be assessed/report each year, and all PLOs will be assessed/reported over a three-year cycle.

Table 4. The academic year (AY) during the three-year assessment cycle the PLO will be assessed/reported.

Program Learning Outcome (PLO)		Reporting Schedule		
		1st AY (Y/N)	2 <sup>nd</sup> AY (Y/N)	3 <sup>rd</sup> AY (Y/N)
1	Demonstrate a mastery of core anatomical and physiological concepts.	Y* (direct)	N	N
2	Apply knowledge of the human body to new and real-world contexts.	Y* (direct)	N	N
3	Extract meaning from visual representations of data (e.g., graphs, tables, images).	N	N	Y* (direct)
4	Synthesize ideas and concepts from multiple sources to create a more comprehensive understanding of integrative physiology.	Y* (direct)	N	N
5	Apply the scientific method to questions related to integrative physiology.	N	Y* (direct)	N
6	Demonstrate effective communication and collaboration skills.	N	Y* (direct)	N

\*Note: All PLOs will be indirectly assessed annually on our Senior Exit Survey.

For each PLO, the subsequent tables provide:

- 1) the **assessment method(s)** that will be used to collect data, including whether the method provides direct or indirect evidence of student learning
- 2) the **metrics** that will be calculated from the collected data to measure student learning, and **targets** that set a threshold for whether an acceptable level of learning was met
- 3) a **description of the assessment** that contains additional information about the assessment methods and metrics (e.g., how and when the data will be collected)

**PLO 1: Demonstrate a mastery of core anatomical and physiological concepts.**

Assessment Method	Metric/Target	Description of Assessment
Pre-post test in IPHY 3410 &/or 3430 (direct)	At least 75% of students will receive 75% of the points for questions on the pre-post test that pertain to this PLO.	IPHY 3410 & 3430 are taught in spring, summer, and fall semesters. The Undergraduate Chair will score all questions that pertain to this PLO.
Senior Exit Survey (indirect)	At least 80% of students will agree/strongly agree that they learned this PLO through the required coursework in their major.	Survey Monkey Survey administered annually in early May. Question uses a 5-point scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

**PLO 2: Apply knowledge of the human body to new and real-world contexts.**

<b>Assessment Method</b>	<b>Metric/Target</b>	<b>Description of Assessment</b>
Pre-post test in IPHY 3410 &/or 3430 (direct)	At least 75% of students will receive 75% of the points for questions on the pre-post test that pertain to this PLO.	IPHY 3410 & 3430 are taught in spring, summer, and fall semesters. The Undergraduate Chair will score all questions that pertain to this PLO.
Senior Exit Survey (indirect)	At least 80% of students will agree/strongly agree that they learned this PLO through the required coursework in their major.	Survey Monkey Survey administered annually in early May. Question uses a 5-point scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

**PLO 3: Extract meaning from visual representations of data (e.g., graphs, tables, images).**

<b>Assessment Method</b>	<b>Metric/Target</b>	<b>Description of Assessment</b>
Pre-post test in IPHY 3280 (direct)	At least 75% of students will receive 75% of the points for questions on the pre-post test that pertain to this PLO.	IPHY 3280 is taught in spring and fall semesters. The Undergraduate Chair will score all questions that pertain to this PLO.
Senior Exit Survey (indirect)	At least 80% of students will agree/strongly agree that they learned this PLO through the required coursework in their major.	Survey Monkey Survey administered annually in early May. Question uses a 5-point scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

**PLO 4: Synthesize ideas and concepts from multiple sources to create a more comprehensive understanding of integrative physiology.**

<b>Assessment Method</b>	<b>Metric/Target</b>	<b>Description of Assessment</b>
Pre-post test in IPHY 3410 &/or 3430 (direct)	At least 75% of students will receive 75% of the points for questions on the pre-post test that pertain to this PLO.	IPHY 3410 & 3430 are taught in spring, summer, and fall semesters. The Undergraduate Chair will score all questions that pertain to this PLO.

Senior Exit Survey (indirect)	At least 80% of students will agree/strongly agree that they learned this PLO through the required coursework in their major.	Survey Monkey Survey administered annually in early May. Question uses a 5-point scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).
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**PLO 5: Apply the scientific method to questions related to integrative physiology.**

<b>Assessment Method</b>	<b>Metric/Target</b>	<b>Description of Assessment</b>
Pre-post test in IPHY 3435 (direct)	At least 75% of students will receive 75% of the points for questions on the pre-post test that pertain to this PLO.	IPHY 3435 is taught in spring, summer, and fall semesters. The Lab Coordinator will score all questions that pertain to this PLO.
Senior Exit Survey (indirect)	At least 80% of students will agree/strongly agree that they learned this PLO through the required coursework in their major.	Survey Monkey Survey administered annually in early May. Question uses a 5-point scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

**PLO 6: Demonstrate effective communication and collaboration skills.**

<b>Assessment Method</b>	<b>Metric/Target</b>	<b>Description of Assessment</b>
Final group project in IPHY 3435 (direct)	At least 75% of students will receive a score of 75% or higher on their final group project, which includes an oral and written component.	IPHY 3435 is taught in spring, summer, and fall semesters. The final group project is graded by the TA and the Lab Coordinator using a scoring rubric.
Senior Exit Survey (indirect)	At least 80% of students will agree/strongly agree that they learned this PLO through the required coursework in their major.	Survey Monkey Survey administered annually in early May. Question uses a 5-point scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree).

- **Reflect on your experience in the Faculty Fellows program and working on your project.**

My final Faculty Fellows project ended up being a much bigger task than I originally intended, yet I'm glad I made the switch. While I still believe it is important to develop a guidance document for how to best use FCQ data in teaching evaluation, in hindsight, this was not imperative. I needed to dream bigger! What the Department *really* needed was a plan on how to evaluate student learning within our undergraduate program. And given my background in science education, my experience as a Faculty Fellow, and my role as the Associate Chair of Undergraduate Affairs, I was the perfect person to develop and implement such a plan.

I am *extremely* fortunate to work in a Department that values teaching and improving our graduate and undergraduate curricula. For nearly two decades, our faculty have supported one another in advancing how we teach science to our students and how we evaluate teaching. So, when I approached IPHY faculty about my Faculty Fellows project of developing a three-year student learning assessment plan, I had unanimous support.

Full implementation of this project will require the assistance of at least 10 IPHY faculty members teaching our required courses. I will take the lead in developing and administering an annual senior exit survey, helping faculty develop a pre-post test for their required course, and analyzing all of the student data. Faculty will be in charge of administering the pre-post test in their courses twice per semester. Without their cooperation, this Faculty Fellows project would not be possible.

Thank you for the opportunity to be a Faculty Fellow, and to Amanda McAndrew and the rest of the ASSETT team for their unwavering support of faculty at CU Boulder.