Why did IPHY faculty want to invest in science education?

Prior to working with the SEI, IPHY faculty felt that students...
• Did not appreciate science education as an opportunity to develop knowledge in future careers, and thinking skills that are critical for success in science
• Reached upper division core courses without having retained knowledge or slipping backwards
• Fell short of our goals of applying that knowledge successfully in situations that require critical thinking, problem solving, and communication

The charge of the IPHY SEI
• To change the culture of science education in Integrative Physiology
• To develop teaching methods that promote a deeper understanding of concepts in physiology so that students retain knowledge
• To promote advanced thinking skills (critical thinking, problem solving, communication) in science

Using faculty working groups, IPHY SEI has successfully addressed these three charges.

Faculty working groups

Faculty working groups are a mode by which groups of faculty teaching similar courses can meet to decide on learning goals, assessments, and have a community to discuss the happenings of their course.

Faculty working groups have been developed in several IPHY courses:
• Human Anatomy: Chris Lowry, Ruth Heisler, Leif Saul & Pei Tsai
• Human Physiology I: Steve Hobbs, Janet Casagrand, Bill Byrnes, Adam Hayes & Ken Wright
• Human Physiology II: Bill Byrnes, Cindy Carey & Heidi Bustamante
• Statistics: Ken Wright, Matt McQueen, Steve Hobbs & Marissa Ehringer
• Neurophysiology: Roger Enoka & Janet Casagrand
• Cell Physiology: Dave Allen
• Endocrinology: Pei Tsai & David Norris

IPHY recipe for getting faculty to work together

Ingredients for successful faculty working groups:
• Groups are small and course-specific
• Meetings occur on a frequent basis (weekly, bimonthly) and last no longer than 1-1.5 hours
• All work for that course will be completed at the meeting in collaboration with other faculty
• Each working group has 2 STFs attending meetings
• Learning theory is incorporated and applied throughout the process of course development
• Workshops applying pedagogy performed with all faculty working groups 2X/academic year

Directions for involving faculty in course development:
• Development of learning goal document
  SEI IPHY has helped faculty working groups create learning goals that describe what students should know upon completion of a course. These goals include everything the faculty hope students will learn, from basic concepts and vocabulary to more advanced critical thinking and data interpretation skills. Establishing clear learning goals informs the students and faculty of the design of the course, as well as defines for students the learning level expectations for the course.

• Course alignment
  Using the learning goal document, SEI IPHY has helped faculty working groups align each element of their course with the goals set out for the students. Alignment helps students see that the practice they are receiving during clicker questions, homework, exams, and/or recitations is deliberate in achieving the learning goal, while it allows faculty to create commonalities between their courses.

• Development of “suites” of questions
  To help ensure alignment between clicker, homework, and exam questions, SEI IPHY has helped faculty working groups develop “suites” of questions for a particular learning goal. These suites of questions work best on application-type questions where the students have to predict the outcome of a change in the scenario. For example, when studying the factors that affect blood pressure, faculty would develop a clicker question on factors that decrease blood pressure, while an exam question would be developed for factors that increase blood pressure. This systematic approach allows faculty to develop a bank of questions on a common learning goal.

Future directions

In our faculty working groups we will continue to:
• Revise learning goals as appropriate and continue course alignment
• Begin the development of in-class activities, research projects, or recitation activities based on the learning goals of the course
• Promote these processes with the remaining upper-division core courses including Exercise Physiology, Immunology, and Sleep Physiology
• Disseminate science education literature to faculty

Testimonials

“Faculty working groups have created an environment that supports and encourages faculty to interact to discuss teaching approaches.”

“[Working with the SEI gave me a] better understanding of how to emphasize and accomplish a more limited, but clearly defined, set of learning goals.”

“The SEI has gotten me to try to develop ways to assess my efficacy as a teacher.”