MODERNIZING THE GRADUATE BIOMEDICAL CURRICULUM

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At the Graduate School of Biomedical Sciences (GSBS) at the University of Massachusetts Medical School, we have been engaged in a multi-year, multifaceted efforts to transform our graduate curriculum to ensure that our trainees develop skills and knowledge needed for success in graduate research and beyond. Our efforts have included establishing NIH BEST grant funded career development initiatives and integrating them into our curriculum, milestones and tracking processes, as well as modernizing our traditional biomedical curriculum to emphasize research and professional skills, scientific communication, data integrity and reproducibility, critical evaluation and synthesis. We describe the latter effort here.

The GSBS is an umbrella admission program, enrolling 40-50 students per year who will ultimately pursue doctoral studies in a wide range of biomedical research areas. Cohorts take some common courses during the first year of study, concurrent with laboratory rotations. We set out to increase the value of the effort applied to course work, while decreasing the duration of time that prevented students from full engagement in research. In the 2016-17 academic year, we introduced Foundations in Biomedical Sciences, a five-month, six-credit course required for first year GSBS students. The overarching goal of the course is to prepare students for research, promote effective communication, and develop problem-solving skills in biomedical science. We have attempted to employ problem-based learning principles, where students are presented with broad research areas, questions, cases, and problems, and assimilate basic concepts and information in context. Students assume a larger share of responsibility for learning than in the traditional didactic classroom, and a series of lower-stakes, and formative assessments replace high-stakes in-class exams as the primary assessment instruments.

We established the following course objectives, indicating what we expect students to know and be able to do at the end of the course.

- Extract, contextualize, and organize knowledge from primary literature
- Comprehend and apply experimental methods
- Analyze and evaluate experimental data
- Formulate biological problems in mathematical terms
- Present of scientific information orally and in writing
- Receive and respond to feedback for written work and presentations
- Formulate and communicate testable hypotheses
- Identify and address important scientific questions and goals

Student performance was assessed through small group discussion participation, writing assignments, quizzes, problems sets, some group work, and a formal presentation.

Student performance, and evaluation surveys from students and participating faculty, indicate some degree of success in meeting these objectives during the Implementation Year and will be used to guide efforts for continuous quality improvement in future years.