Professional Development Assessment for the Biology PhD Program

The Biology PhD Program’s Learning Goals are:

1. Demonstrate both broad and specialized knowledge in the chosen biology subprogram, including the ability to:
   A) read and critically evaluate the research literature
   B) explain the experimental, observational, and/or analytical bases for current theories
   C) design an approach to address a major unresolved research problem
2. Make a substantial and original contribution to the field. In most cases, this will include publication of one or more first-author papers in peer-reviewed journals, in addition to preparation of a dissertation.
3. Organize, format, and present data effectively in both written and oral form, display applicable computational and quantitative skills, and demonstrate excellence in teaching.
4. Interact effectively and collegially with others in the field and conform to the fundamentals of ethical research conduct.

Learning goal #3 emphasizes the importance of “presenting data effectively in both written and oral form,” and of demonstrating “excellence in teaching.”

This assessment concerns our Program’s efforts with regard to:

A. Peer-mentoring (students learning from more senior students how to progress efficiently in the Program)
B. Learning to teach (Learning goal #3)
C. “Science Writing” (Learning goal #3)

**A. Peer-mentoring:**

In Winter 2011, our Program instituted a day-long event involving our first-year doctoral students. The morning was spent in a peer-mentoring session involving the first-year students and third-year students. The third-year students presented posters, describing their proposed doctoral thesis projects, and then answered first-year students’ questions about a) preparing for the First Exam b) finding a mentor c) choosing a thesis project d) preparing for teaching, etc.

**Assessment:** This workshop has been held every year since, and in winter 2013, we distributed a survey to all first-year students, asking about its effectiveness. A tally of that survey is attached (Survey Tally 2013.pdf). 56% of the students felt the peer-mentoring session was of enough value to recommend it to next year’s students, 36% somewhat agreed with that evaluation, and 8% seemed to find it was of little or no use. We asked for general comments on the survey, and the overwhelming opinion seemed to be that the first-year students didn’t value the poster session (as they had seen many science posters at the Fall Orientation) but highly valued advice provided by the more senior students.
Response to Assessment: Accordingly, in Winter 2014, we modified the peer-mentoring session to consist of a) a panel discussion among 3rd and 4th-year students, with questions being offered by 1st-year students and b) unstructured discussions among students, broken into groups by subprogram (Biology has four subprograms: MCD, EEB, PS, and NS).

Again, a survey was taken, and satisfaction was significantly higher (77% agreed that the session should be convened again for next year’s students; 23% “somewhat agreed”).

We find that this exercise is also something the 3rd and 4th years students seem to enjoy, and it builds students’ ability to “interact effectively and collegially” with others in their field, another of our Program’s Learning Goals (LG #4).

B. Learning to Teach.

The afternoon session for the Winter event held for first-year students is a workshop on teaching in the sciences. This workshop is followed by “in-classroom” observations by the first-year students. For the latter, the Program solicits lists of effective doctoral student instructors (sometimes non-doctoral, post-baccalaureate instructors, as well) from the CUNY senior college Biology Departments. These lists are provided to the first-year students who arrange a date to observe the instructor in action. A list of the instructor/student pairs is maintained in the Program office (with date of observation indicated). We receive “thank you’s” from students who enjoy this experience, but we have not done any formal evaluation of this practice. The students are told to consider the instructors as potential teaching “mentors” when students begin to teach in their second year in the Program.

Initially, the teaching workshop (Winter mentoring/workshop event) was primarily an “information session,” that we found was only marginally useful. In 2012, we began to use teaching “exercises” that engaged the students in identifying effective and ineffective teaching strategies, as well as in showing them how to introduce “active” learning into their own classrooms. The workshop lasts about 4 hours.

Assessment: As with the peer-mentoring sessions, we began to take surveys about the teaching workshop in Winter 2013. As shown in the attached file, the response to this was generally very favorable, with 72% to 77% saying they would recommend it for next year’s students.

Response to Assessment: One survey question that we’d like to further investigate is the one that asked whether or not many of the student’s questions about teaching next year were answered. As many as 36% of respondents said this was only somewhat true. In future surveys, we will want to ask students to identify specifically which of their questions were NOT answered.
Future steps to take: Another possible means of assessing the outcome of these teaching workshops is to evaluate teaching performance by our PhD students in their 2nd year (the first year they teach). Formal teaching evaluations (both by classroom students and by faculty members) could guide us in our teacher-training efforts. Most of the CUNY campuses require that these evaluations be carried out, but the results are not normally available to our Program.

C. Science Writing

In 2012, the Research Foundation provided funds to the doctoral Programs for the express purpose of training our doctoral students to write successful research grant proposals.

Scientists devote a large portion of their professional effort toward preparing research grant applications. Unfortunately, relatively few have been trained to write effectively. One difficulty is that few writing courses recognize and focus upon the special issues involved when writing about scientific research. Recognizing this, a growing number of major research institutions have begun to develop writing courses that center on this particular form of writing.

In summer 2012, the Biology PhD Program, in partnership with the PhD Programs in Biochemistry, Chemistry, and Physics, used RF funds to bring Dr. Judith Swan to the Graduate Center to convene two days of workshops on Effective Scientific Writing. Dr. Swan is Associate Director for Writing in Science and Engineering in the Princeton Writing Program at Princeton University. She has held workshops at numerous research universities and corporations (e.g. Cornell University, Mt. Sinai School of Medicine, The Rockefeller University, University of Pennsylvania, Vanderbilt University, Bristol-Myers Squibb, Merck Pharmaceutical Corp., to name a few).

Assessment: A survey was used to gauge student satisfaction with the workshops. With 44 to 46 participants, the response was overwhelmingly positive. 91% felt they had learned skills they could use in their future science writing, 95% felt the writing samples provided were relevant to the kind of science they were writing about, 95% felt the workshop was worth their time and 91% recommended it to others. While the survey included an option for disagreeing with statements like “In this workshop, I learned specific skills that I know I will use in my future science writing,” no participant chose this option.

Response to Assessment: In 2013, a second summer workshop was convened, again with Dr. Swan. Some of the requests made in the “open question” section of the 2012 Survey were met in the 2013 workshop. Again, the response was very positive. However, the survey was changed as requested by Dr. Swan.

Common comments in the “open comments” section of the 2013 survey were “please – make more such workshops available; provide one-on-one sessions with
In response to this, one of our faculty members initiated a 2-credit course entitled “Grantmanship: Science Writing.” An increasing number of our students are taking this course (6 were registered in Fall 2011; 10 enrolled in Fall 2013).

*Future steps to take:* In future, we will incorporate aspects of both surveys for the “Effective Scientific Writing” workshop, as it would be useful to know if responses broke along language (native language English vs non-English) and/or scientific discipline lines.

Attachments:

- Peer-mentoring and Teaching workshop survey
- Survey tallies 2013 and 2014
- Science Writing workshop surveys
- Survey tallies 2012 and 2013