

# Assessment Report

## Physics Department Budget and Planning Committee

*"...when you can measure what you are speaking about and express it in numbers you know something about it; but when you cannot express it in numbers your knowledge is a meager and unsatisfactory kind; it may be the beginning of knowledge but you have scarcely, in your thoughts, advanced to the stage of science, whatever the matter may be." – Lord Kelvin*

### **Background**

The Budget and Planning Committee (BPC) was tasked with responding to the external reviewers' report and otherwise continuing our work on assessment. The committee met five times to discuss this issue. Individual members of the committee were asked to choose sections of the reviewers' report, or other areas related to assessment that interested them. The individuals investigated these areas of interest and brought information back to the committee for discussion and review.

We expect that the BPC and the department as a whole will continue this work next year. Since membership in the BPC will rotate to include other faculty next year, we will footnote individuals who have information of interest to next year's committee.

We describe our efforts in regard to the four general recommendations of the reviewers, the nine specific recommendations (with many sub-recommendations) and our other activities. We conclude with our own recommendations.

### **General Recommendations of the Reviewers:**

- 1) The department should consider housing the primary authority for assessment in its existing Budget and Planning Committee.**

This has been done.

- 2) The department should consider breaking the Assessment Activities into three types; Start-up Actions, On-going Activities and Current Issues.**

This was discussed. We are currently in the Start-Up phase.

- 3) The department should consider reducing the dependence upon surveys.**

The reviewers state: *"Surveys are notoriously difficult to design, validate and analyze. In addition, they are time consuming and expensive to administer. Surveys can be useful, but many well designed and validated instruments are available such as the MPEX and FCI. Also, the AIP Statistics Division has a large collection of reports that provide a*

*good snapshot of many of the issues that the current plan addresses.*” We examined copies of the MPEX and FCI, and came to a greater appreciation of this point. We will continue to examine how surveys based upon validated instruments can be used to help us assess our students<sup>4,6</sup>.

**4) The department should consider how professional development of faculty should be included.**

Our department already credits professional activities related to Physics teaching and learning. We could do even more by regularly including teaching and learning related talks in our seminar series and hosting more AAPT meetings, workshops and summer learning institutes. Implicit in this recommendation is the need for time to engage in such activities.

**Specific Recommendations of the Reviewers:**

**1) The department should consider breaking out the Desired Outcomes for client population 1 into at least three distinct career tracks; graduate school, employment and high school teaching.**

There was some discussion of this topic. This recommendation is related to an area in our assessment plan that discusses the possibility of developing alternate major options within the Physics department. Physics is the ONLY department in the College of Science with only one degree option in the department. Perhaps next year the BPC could organize its discussions with a view to deciding whether or not we should develop another degree option.

**2) The department should consider building timelines for Start-up Actions and On-going Activities**

We agree, clear timelines could help us focus on completing tasks. While working on this assessment, the BPC discovered that the NSF has a special track in the CCLI program (<http://www.ehr.nsf.gov/ehr/DUE/programs/ccli/>) devoted to funding assessment efforts. Members of the committee have been in contact with the relevant NSF program officer. It appears that this particular track has limited funds available. However, the record of funded projects on the NSF website provides a rich resource regarding assessment work elsewhere. Faculty in our department have been very successful in the past in obtaining funding from CCLI program tracks (two of us have reviewed proposals for the precursor to the current program). Thus, it is worth continuing to investigate this program. The discipline imposed by writing a grant proposal can help set timelines, even if the proposal is not funded or not even submitted<sup>5</sup>.

**3) The department should consider constructing Outcomes/Area Matricies as a Start-up Action.**

The reviewers report states; “*An integrated assessment process must have clear lines of responsibility. Building an Outcomes/Curriculum Matrix will assist the Curriculum or Lower Division Lab committee as they move forward assessing the course of study. An Outcomes/Budget Matrix might help the Budget and Planning Committee focus funding in areas that are found to need it as a result of the assessment process.*” The BPC began to examine an Outcomes/Curriculum Matrix near the end of its discussions this year. We hope that next year the BPC will continue to examine and develop this tool. Funding issues are discussed at the end of this report<sup>4, 5</sup>.

**4) The department should consider building an alumni database as a Start-up Action.**

This is an excellent suggestion. We currently have contact information for only some of our alumni. We should make an effort to find this information for all of our Alumni. The Geology Department in the College of Science has fewer alumni than the Physics Department has. Yet they have very good alumni relations and have developed three endowed scholarships in their department. Perhaps the Geology chair could be invited to a BPC meeting next year to consult with us.

**5) The department should consider creating an Advisory Board.**

We have started to create one. We contacted one of the reviewers for advice on how to do this. There may be more information available later for next year’s BPC<sup>5</sup>.

**6) The department should consider adding the following On-Going Activities for client population 1.**

- a) **Senior research projects as a capstone activity.**
- b) **Student seminar presentations as a capstone activity.**
- c) **Maintain consistency in introductory courses with CAN and IMPAC.**
- d) **Encourage faculty contacts with other physics educators as a form of professional development.**
- e) **Compare careers of graduates with national norms established by AIP.**
- f) **Institutionalize alumni contacts such as annual newsletters and invitations to seminars.**

We already do, e.g. (a) and (b). Others will take more work. Some of the BPC members are familiar<sup>4</sup> with “CAN” and “IMPAC” and some are not<sup>5</sup>. While we have not applied for a CAN, our introductory courses are consistent with CAN courses. A useful website is at: <http://www.cal-impac.org/index.htm>

- 7) The department should consider adding the following On-Going Activities for client population 2.**
- a) Maintain consistency in introductory courses with CAN and IMPAC.**
  - b) Continue dialog with departments whose students are served.**
  - c) Participate in accreditations of these other departments (e.g. ABET).**

Most of our students are not majors and we have little information on how successfully they are able to use the Physics we teach them. The BPC learned that Physics scores are not broken out separately on the MCAT, but we were able to obtain sample MCAT tests from the SEES office. We are examining these to see how well they correlate with the content in our 120 Physics series<sup>5</sup>.

- 8) The department should consider adding the following On-Going Activities for client population 3.**  
**Maintain consistency with campus standards for General Education courses.**

There was no specific discussion of this topic.

- 9) The department should consider adding the following On-Going Activities for client population 4.**
- a) Maintain consistency with the requirements of the Commission on Teacher Credentialing.**
  - b) Maintain consistency with the more recently introduced K-12 science standards, such as the National Science Education Standards, Project 2061, and the California Science Content Standards.**

There was some discussion of this topic. Many of our faculty have been involved in projects with K-12 teachers.

## Other Activities

**1)** A subject we have sometimes discussed is the possibility of having discussion sections associated with our Freshman lectures. This is normal practice at many universities. Possible models for discussion sections are the SEES workshops within our own college. The BPC was able to obtain data on the grade distributions of SEES students who have participated in workshops. Based on data that have been collected by the SEES administration over at least a twelve-year period (1989-2001), one can conclude that students who have attended SEES workshops for a particular course in general achieve a GPA of roughly 0.5 to 1.0 grade points higher than the general population of the course. Data have been compiled for all Physics courses for which SEES workshops were offered. These include the College Physics series (PHY 121, 122, 123) and the General Physics series (PHY 131, 132, 133)<sup>3</sup>.

2) Explicit or implicit in several of the recommendations of the reviewers are budget and workload issues. At the moment, the University, College and Department are in a state of budget freefall, so no clear plans or commitments can be made. But the BPC notes that historically the average lecture and lab sizes in the Physics department were close to the College of Science average. In a specific response to the budget allocation model developed by Simon Bernau (former Dean of the College of Science), the department made a variety of modifications to its curriculum. These modifications were difficult, painful and controversial, since the net effect was to increase our average class sizes. A significant minority of faculty felt that this would damage our ability to teach the difficult conceptual topics in Physics to our students, limit our ability to teach special topics classes, and that any money saved by doing this would simply be hijacked by the administration. However, ultimately the department made innovative and creative changes to our scheduling and curriculum. Under the budget allocation model developed by Dean Bernau, a portion of the funds saved was retained by the department. We used these funds to replace critically obsolete or broken equipment and to provide very limited amounts of assigned time for faculty involved in specific projects of benefit to the mission of the department<sup>5</sup>.

Unfortunately, the budget model has apparently been changed with no consultation with the faculty in our department. It appears that there is now no benefit to the department in teaching larger classes. As part of the assessment process, we collected data on workloads over the past year. We are disturbed that it was far easier to collect system-wide data than data from within our own campus. But the data collected over the past year demonstrates that the workloads in Physics are much higher than either CSU or College of Science norms<sup>5</sup>. This is true whether the comparison is of class size, WTU's or contact hours (see appendices). Thus, the department should decide over the next year whether it should return to prior practice (a right set in article 20 of our contract) and use the college average class sizes as our scheduling targets. While we are happy to do our part and willingly put in an extra effort to help the university during this period of fiscal crisis, it is important for the College to develop a clear and honest resource allocation process. It is possible to develop win-win budget models and we look forward to working with the administration in doing so.

## Our Recommendations

**We recommend that next year the BPC focus on a limited set of objectives and report back to the department at the end of the academic year. These objectives should include at least:**

- 1) Developing an alumni database**
- 2) Contacting alumni for the purpose of assessment**
- 3) Making a clear case for or against creating other degree options in the department**

- 4) **After discussion with the administration, making a recommendation to the department as to whether or not we should return to prior practice and schedule so that our class sizes match the College of Science norms.**

Respectfully Submitted,  
Physics Budget and Planning Committee

Soumya Chakravarti<sup>1</sup>, John Fang<sup>2</sup>, Kai Lam<sup>3</sup>, John Mallinckrodt<sup>4</sup>, Steve McCauley<sup>5</sup>,  
Hector Mireles<sup>6</sup>, Mary Mogge<sup>7</sup>

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