

To: Faculty Senate

From: Academic Program Review committee of the Faculty Senate: subcommittee members James Longhurst (Asst Prof, History) and Glenn Knowles (Assoc Prof, Economics)

Date: April 19, 2010

Subject: Ongoing UW-System / UW-L 5-Year Joint Review of the UW-L Biochemistry program

I. Executive Summary

II. Procedural Posture

III. APR's Summary of Self-Study

A. comments/strengths/weaknesses

B. purposes

C. curriculum

D. assessment of student learning and program success

E. previous APR and new program initiatives

F. personnel

IV. External reviewer

V. Dean's Letter

VI. APR Recommendations

VII. Motion to the Faculty Senate

I. Executive Summary: The biochemistry major, housed in the UW-L Chemistry Department, must complete a 5-year Joint Review, as required of all new programs. This memo from the Academic Program Review committee of the UW-L Faculty Senate comments on that ongoing review, and on the documents produced by the biochemistry program for that review.

II. Procedural Posture: The Faculty Senate Chair has asked the APR committee to complete an abbreviated review of the materials submitted by the biochemistry program as a part of the ongoing UW / UW-L 5-Year Joint Review. This abbreviated review is in addition to the ongoing joint review process. At this time, the original documents from the planning and implementation phases of the new program, along with a self-study, an external review, and the dean's letter of comment have been completed. As such, the 5-year Joint review of this new program is ready to move before the Provost and the UW-system review process. The biochemistry major will come up for a complete and formal APR review when the scheduled review of the Chemistry department, institutional home of the biochemistry major, occurs in the 09-10 academic year, and again in 2014-15, following the five-year accreditation review cycle of the Chemistry department. This memo does not replace that review.

III. APR's Summary of Self-Study

A. comments/strengths/weaknesses

While there are important mismatches between the goals and contents of the 5-year joint review self study and an APR self study, it is still possible to evaluate some (but not all) of the criteria normally a part of an APR report. Notable omissions include a lack of information concerning teaching load, lack of a set of unit data sheets, inability to review the application of the UW-L Faculty Workload Policy in this case, and lack of formal responses to external reviewer comments. Still, combining observations on the self-study and drawn from the report of the external reviewer and dean, these comments about the new major seem supportable:

strengths:

- number, and increasing number, of high-quality students enrolling and graduating
- high demand for graduates in the work force

- new curriculum design is well-thought out, contemporary, inspired by regional collaborations, and aligned with goals and norms in the field
- administrative support
- committed faculty who proposed, planned and implemented the program, thus having full "ownership" of the program's success

weaknesses:

- popularity of major and courses has evidently placed demands on faculty time
- funding for teaching laboratories is low
- support for faculty and student research is insufficient to needs
- need for further strategic planning

B. purposes

In the summer of 1999, two chemistry department faculty were inspired by regional collaborative meetings to propose a major in biochemistry at UW-L. Todd Weaver and Sandra Grunwald authored an Executive Summary and an Authorization to Implement for the program, with eight major goals (see 5-Year Self-Study, and Appendix I). Primary among these is the creation of a curriculum and coursework that bridges multiple specialties and prepares students for careers in biochemistry; emphasis of hands-on laboratory work; the use of bioinformatics; and research opportunities. The biochem self-study indicates full or partial success in meeting *all* of these goals.

C. curriculum

Curricular design is particularly key to an interdisciplinary program such as this one. According to the original documents proposing the major, "the biochemistry curriculum has been designed to integrate course material from the departments of chemistry, biology, physics and mathematics." (Biochem self-study, Appendix I) These course paths were chosen following recommendations and best practices from the American Chemical Society (ACS) and the American Society for Biochemistry and Molecular Biology (ASMB) along with best practices and inspiration from regional collaborative workshop organized by the national science education advocacy group Project Kaleidoscope (PKAL).

The curriculum specifies a series of core courses, most from Chemistry and two from Biology; however, those core courses require a number of prerequisite courses, including courses from Biology, Microbiology, Math and Physics. As the self study puts it, "In total, 15 cr in biology and 32 cr in chemistry are taken by students within the biochemistry major. In addition, the students are required to complete 9 cr in math (including calculus) and 8 cr in physics." (Self Study, Section B Objective 3). According to the second objective listed in the Biochem self-study, the goal of this curriculum is to cover "the areas of biochemistry, molecular biology and biophysical chemistry." Along with elective courses from Microbiology and other departments, this curriculum represents a challenging and diverse schedule of courses. This curriculum is building toward four courses, described as "seminal" on the Biochem website: Biochemistry I and II, Molecular Biology, and Biophysical Chemistry. The fact that these are difficult and demanding courses, and that success in this major requires students to generally adhere to a year-by-year succession of prerequisite courses, highlights the significance of the large and increasing number of students who choose this path.

The external reviewer stated that "the program has done an outstanding job [in] it's curricular design. ... Once the senior seminar is offered a solid program will be in place." However, there were some caveats that are noted in section IV: External reviewer below.

D. assessment of student learning and program success

Self Study Section D 8 identifies Student Learning Outcomes (SLOs for the biochemistry program, and describes measurement tools and rubrics for assessment. These SLOs range from specific skills and knowledge related to laboratory technology and experience fo the "primary literature of biochemistry" to more general goals, including "effective critical thinking and reasoning ability," and

“formulate a strategy for solving the problem.” The Biochem self-study report includes summaries of both indirect and direct assessment, the former from CHM 418 Biochemistry Lecture/Lab and the latter targeted at graduating seniors. In addition to examples of student class work, the self-study presents results from questionnaires and interviews tracking both current students and the employment histories of recent graduates.

The external reviewer rates the assessment plan as adequate and recommends more work in the area of formative assessment. The external reviewer notes the difficulty in developing program assessment tools and recommends some low-cost assessment resources available from NSF and PKAL. See section VI. APR Recommendations.

E. previous APR and new program initiatives

The Chemistry department completed an APR self-study and review process in 06-07, which included the biochemistry major. While there is not a great deal of review of the biochem major in that self-study, many of the themes from the biochem review documents appear in the Chemistry review, including concerns about laboratory and facilities funding and IFTE/SCH concerns. Beyond that, there are no previous APR and new program initiatives in this case, as this is a new program.

F. personnel

The 06-07 Chemistry APR summary notes that while the number of IFTEs in the entire department had increased in the period from 200-2004, the number of student credit hours had also been on the increase:

“While data on the number of Chemistry IFTEs show a consistent increase in staffing from Fall, 2000 to Fall, 2004 (Figure 3), student credit hours (SCHs) per IFTE has also increased, from approximately 230 to approximately 324. The data in Figures 4 and 5 show a) a steady increase in SCHs per faculty generally, as well as in terms of Chemistry’s offering in the University Core (General Education). The data imply, however, that the increase in SCHs is significantly due to courses offered for students majoring in chemistry, the biological programs, and in pre-professional programs, rather than those offered in the University Core.”

So, in a way, biochem’s increasing popularity has placed serious demands on its personnel, as noted in the external reviewer’s report below. While this observation seems to be supported by a variety of documents, it is not possible for APR to complete a full evaluation of IFTE/SCH and faculty workload, as this 5-year joint review self-study is not required to include unit data sheets as APR self-studies are.

Despite that limitation, the addition of a full-time tenure-track position in Fall 2009 is noted in multiple documents as an important step towards addressing the personnel needs of this major.

IV. External reviewer

In September of 2008, the biochemistry program at UW-L hosted the visit of an external reviewer, Dr. Joseph Provost of the Minnesota State University at Moorhead. The simplest summary of Dr. Provost’s findings is contained in this sentence: “All told, the new program has met its initial goals and has done so very well.” At the same time, Dr. Provost both recommends further strategic planning, and cautions that “the increasing number of students in the program, high number of course sections (and resulting overloads) and general demands of a small number of faculty has the potential to outstrip the ability of the faculty to meet these needs.”

One of the clearest indications of the program’s success, noted both by the external reviewer and the dean, is the number of majors attracted to a demanding and rigorous program. Dr. Provost writes that “the number of majors in the program have increased nearly each year since its inception.”

This growth is reflective of multiple causes – most likely, both the excellence of the faculty and course offerings, and the possibility of employment opportunities for graduates. As Provost puts it, “The continued career growth of the biochemical industry enhances the need for such a program.”

There are some possible downsides of such popularity, however. There appeared to be a tendency, recorded by Provost, of faculty to open up additional sections of courses to better serve student demand. But this development, while serving student needs, also put additional strains upon faculty. “While it is honorable to find a way to add an additional section of a class into a faculty’s schedule,” Provost writes, “in the long term, this will hurt the faculty in the unit.” In addition to placing extensive demands on faculty, “the small number of biochemistry faculty involved in the program limits the number of students that can conduct meaningful research.” While Provost was positive about the possibility of hiring one additional faculty member (who joined the program in the fall of 2009), it is still true that staying within the teaching capacity of existing faculty is a brake upon the long-term growth of this program.

On the subject of classes and curriculum, the external reviewer was extremely laudatory concerning curricular design, and in particular the design of the recently-developed biophysical chemistry course comes in for praise. Importantly, the reviewer notes that the UW-L biochem major met both ASBMB and ACS suggestions for curricular design. The report indicates that the assessment plan is adequate; but urges further development, particularly linking assessment to future maturation of the program. In other words, the external reviewer is urging that assessment of the program be further linked with strategic planning, with built-in review. The curriculum was judged as lacking only a senior capstone course, which was to be offered in 2009. Overall, Dr. Provost was exceptionally laudatory of the course design and curriculum. Recommendations include creating an effort to create resources for students to ease transition into employment, and seeking partnerships with local companies to bridge the gap. Further development of the program should seek to increase the research possibilities for students, develop a long term plan, revisit and strengthen the program’s mission and assessment plans, increase diversity of biochemistry classes for the major, and accomplish this all while reducing the overload and increase possibilities for faculty.

It is still clear that while the reviewer has recommendations for the future of the biochem program, that as a review of the initial founding of a new program, this report has nothing but positive evaluations. Put simply, “The biochemistry program has done an outstanding job of creating and executing the goals of the implementation plan.”

While Dr. Provost writes that “A new chemistry and biology building is definitely due,” it is unlikely that this report will produce funding for that project immediately. It is still worth noting that this demand is clear; in the 06-07 APR summary of the Chemistry Department, this “The Department needs major investment in its labs, many of which are in disrepair, and need modernization and upgrading.”

On a more manageable scale, however, the external reviewer’s strongest language throughout this report appears in sentences assessing instructional laboratory funding. Provost writes that the budget for instructional laboratories is “far below that for the most modest of needs.” Comparatively, he found funding for biochem laboratories to be “sub-par compared to several other laboratories on campus,” and “lower than that described by the Delaware study.” Addressing this issue is deemed “crucial,” and a dire warning is issued to the effect that “Any reduction would be devastating for students and faculty.”

“In closing, the biochemistry program and University Wisconsin La Crosse has been very successful in creating a quality major and has the potential to do much more.” Dr. Provost recommends that the core faculty who created the biochem major come together “to use the same strategic vision used to start the program as they determine the next phase for the program.”

V. Dean’s Letter

The letter from Dean Karen McLean of the College of Science and Health, dated March 23, 2009, enumerates the materials included in the 5-year review, which satisfy the requirements of the intitutional component of the 5-Year Joint Review process. Required materials include the authorization to implement, the self study, an external review, and an executive summary of the original planning

documentation. The Dean declares that the biochemistry major “has been successfully implemented and is growing rapidly.” Perhaps the most important single observation in all of the documentation for this review process is the fact that the biochem major has grown from 40 majors to 150 over the program’s first five years. The Dean’s letter emphasizes rapid growth in the number of majors, mirroring growth in employer’s demands for graduates of such programs.

This letter notes the external review’s comments that the major is adequately funded, but at the limits of its resources. Of particular concern of the external reviewer, noted by the dean, were the limited instructional laboratory budgets. While the letter stresses that “the reviewer noted that the current resources allocated to the program (human, space, financial) are sufficient to achieve the program mission, vision, and goals. However, he stressed that the program is currently stretched to the limits of those resources.” Dean McLean notes that while the external reviewer was concerned about staffing, a third biochemist was hired and was to begin teaching in Fall 2009.

The letter notes that the external review speaks approvingly of the curriculum of the major, meeting standards for suggested content, and noting that the program “has met all of the initial programmatic goals” except for one proposed seminar for career development of seniors. While the external reviewer offered views on the curricular design, they were mostly aimed at the future improvement of the program, including further strategic planning and institutional partnerships.

The dean’s letter concludes with the statement that “[T]he College office supports these recommendations and suggests continuance of the Biochemistry program at UW-La Crosse.

VI. APR Recommendations

The UW System “New Program Implementation and Joint Review” process calls for the Provost to make a recommendation to the Associate VP on the continuation, modification or discontinuation of the program. The APR Committee will not make such a recommendation, which is beyond its purview, but will make recommendations for program improvement with modest resource implications. Recommendations with major resource implications (such as hiring new faculty or discontinuing the program) will not be addressed.

The external reviewer notes that the program is at a critical point, providing specific recommendations that include a “functioning oversight biochemistry committee.” The APR Committee makes a slightly stronger recommendation for the creation of a biochemistry task force (which may include faculty in biology) with two primary tasks: (1) long-range strategic planning and (2) program assessment. This may require some modest resources in the form of summer appointments and/or attendance at assessment conferences to develop the tools and skills necessary for program assessment

VII. Motion to the Faculty Senate

As all reports to the Faculty Senate from the Academic Program Committee constitute motions to the Senate, the committee moves that the self-study submitted by the Biochemistry program as a part of the 5-year joint review process is appropriately complete.