

Mathematics Program Performance Review
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Introduction

As part of the Seven-year Program Performance Review (PPR) of the Department of Mathematics Program at California State University (CSU) Fullerton, the review team made a one-day visit of the department on March 2, 2011. It should be noted this PPR was postponed by one year due to the furloughs in 2009-10. Prior to the visit, the team was provided with the PPR self study 2010-11, the “Final Report” of the Review Team from the previous PPR (2003), the “Department Response to the Report of the external PPR Committee” (July 2, 2003), and the subsequent College of Natural Sciences and Mathematics document “Recommendations to the Department of Mathematics” (undated). Additional documents were requested and received and are listed at the end of this document. During the one-day visit the team conducted focus group interviews with the Dean (Dr. Robert Koch) and Associate Dean (Dr. Mark Filowitz), the Chair (Dr. Paul De Land), office staff, tenure-track faculty, tenured faculty, lecturers and part-time faculty, mathematics majors and graduate students, and a session open to all departmental faculty. The review is comprised of two components: I) Commendations for the department and II) Recommendations for Improvement and Challenges. We have incorporated critiques of the Department’s previous and new seven-year plan into the subtopics of these two sections.

In terms of highlights, the team was impressed with the range of the Department’s course offerings and quality of teaching, the feeling expressed by staff, students, lecturers, and faculty of being part of a family, and especially the department’s ability to respond to fluctuations in FTES (1400 to 1800) together with the dramatic tightening of its budget allocation due to the economic recession that began in 2008. It should be noted that the Mathematics Department is unique both in the number of students it serves and the fact that most who enroll in their courses are majoring in another discipline. So while nurturing their degree programs, attention must also be given to the needs and concerns of departments served by core mathematics coursework (e.g., Engineering). The feedback we received, from those within the department as well as representatives from so-called “service” departments, demonstrate this balance is being handled quite well. In fact, the Supplemental Instruction (SI) program, which received

accolades from several constituent groups, was created largely to serve students from majors other than Mathematics.

Among the areas of challenge we noted include those that can promptly be addressed from within (revision of RTP Standards; clarity and consistency of lecturer evaluation) to items less within the department's control (chronic space issues largely unresolved since the 2002-03 PPR).

Overall we noted a strong and shared commitment to doing the best possible—with whatever resources are available—to provide students excellent learning, research, and advisement experiences.

I. Commendations of the Department's Strengths

A. Commitment to Department

There was a strong commitment expressed by everyone—from faculty to staff to students to lecturers—to the Mathematics Department as a whole. Rather than seeing themselves as isolated, separate parties doing their own work, we got the sense that folks felt part of some larger enterprise to which they held a shared responsibility. This is remarkable given the size of the department and the large number of courses and programs offered. We speculate this *esprit de corps* is due to a common love for mathematics and those who share this passion!

B. Quality of Recent Full-time Faculty Hires

Since its last PPR in 2002-03, the Department of Mathematics has hired 12 new faculty, (and during the same time lost two faculty who resigned and had six faculty retire). In our conversations with tenure-track faculty, the team was impressed by their enthusiasm, concern with quality teaching and learning, and their scholarly and creative activities (many involving collaborations with undergraduates).

C. Quality of Mathematics Faculty and Programs

The faculty of the Department of Mathematics is to be commended on their productivity, teaching performance and the numerous awards at both the college and national level. Over the last eight years the faculty have published seven books and 189 articles in refereed journals. In addition, more than 12 million dollars in grant funds have been received over the review period. The faculty has also been more active with undergraduate and graduate student research, including numerous conference presentations and peer-reviewed publications, than in the previous review period. As noted in the department's PPR Self-Study (as well as the 2002-03 PPR review), the mathematics education faculty and programs are among its greatest strengths, receiving over \$8 million in the past eight years. In addition, the single subject credential program in mathematics has remained a goal for many of the undergraduate mathematics majors

with over 60% in the so-called “Teaching Concentration.” As such, the entire faculty recognizes the importance of the contributions each makes to the work of preparing future teachers of mathematics.

D. Quality of the Office Coordinator and Staff

The office coordinator and staff, like the faculty, are extraordinarily devoted to the mathematics department. Given the high volume of students that they serve and the small space they are in, the staff have very high morale and by all accounts do an excellent job with limited resources. However, the office appears to be understaffed and additional personnel would allow them to complete additional projects that could improve the administration of the department.

E. Programmatic Assessment of the Foundational Mathematics Curriculum

The 2002/2003 PPR report mentioned the need to develop a process for programmatic assessment of the mathematics curriculum, particularly for courses taken by large numbers of non-mathematics majors in order to gauge how well-aligned the courses are and to generate data with which to make modifications, as needed. Extensive data were presented in the Department’s 2010-11 PPR Self Study about their progress in this area. Common assessment items were used across sections of high-demand courses and student success across major transition points was examined (e.g., Math 125 into Math 150A; Math 150B into Math 250A). In general the data show a strong alignment between courses, for instance students in Math 150 who earn As are more likely than those earning Bs to subsequently earn As in Math 150B.

F. Implementation of Supplemental Instruction Program

The Supplemental Instruction program was instituted in 2008 as an outgrowth the department’s existing workshop program and a National Science Foundation grant to increase retention and number of graduates in Science, Technology, Engineering and Mathematics (STEM) at CSUF and with two partner junior colleges. With leadership provided by two mathematics education faculty, training courses have been developed for SI leaders (undergraduates in the mathematics major) and on-going mentoring is provided for their work to support students in several foundational courses (i.e., Math 125 and Math 150A/B). The improvements in student performance are significant and undeniable, and it would appear this program has the potential to help reduce the non-success rate of students in many of the courses that keep STEM and other majors from moving on successfully (e.g. Pre-Calculus, Calculus). The success of the SI program in increasing student pass rates is commendable.

G. Development of MS Statistics Online/Distance Program

Several faculty have begun piloting tools to develop mathematics courses that can be delivered remotely. They reported success and positive student responses to these and are planning to seek approval for an online/distance Master's degree program in Statistics. This is an exciting opportunity for the department to tie-in with companies who may want their employees to obtain advanced training in Statistics and would be willing to allocate employee time on-site to participate in instruction delivered via the web. Faculty are encouraged to continue to develop their skills in online instruction to support students' engagement with both synchronous and asynchronous learning activities.

H. Mentoring and Support for Students, Particularly from Underrepresented Groups

The number of bachelor's degrees awarded in mathematics almost doubled from 2003-04 to 2008-09 from 30 to 52. This reflects the high degree of involvement faculty have with mentoring mathematics majors and engaging them in programs that creating a sense of community and support. Specific examples of this include the Math Club, SMART Girls, Project MISS, and the exceptional performance of the Putnam Team. It should be noted that there has been a subsequent decline in 2009-10 in bachelor degrees in mathematics awarded likely due to budget-related campus enrollment restrictions that since Fall 2008 have severely restricted community college transfers who make up 1/2 of those earning a Bachelor's degree in Mathematics.

II. Recommendations for Improvement and Challenges

A. Development and Implementation of a Hiring Plan

There are currently 13 full professors out of a total of 29 full-time faculty. The Self Study report indicates 5 faculty plan to retire and another 4 are considering retirement during the next seven-year PPR period. The hiring plan in the PPR mainly addresses replacement of these faculty members with some limited plan for growth. However, the full-time tenured/tenure-track faculty are only 51% of its FTEF (whereas the CSU target is 75%). As a result, the number of lecturers, full- and part-time, is huge—well over 60! This in part reflects the need for flexibility in covering a rather unbalanced course schedule due to required course offerings for, among others, first-time freshmen each fall semester with FTES sometimes dropping by as much as 400 FTES in spring semester. Despite this semester enrollment imbalance, we recommend that the department revisit its hiring plan over the next year through open discussions with all its full-time faculty members and incorporate a goal to increase its percentage of tenure-track faculty over the next seven years. For example, a goal of 60% of FTEF be tenured/tenure-track in the next seven years might be reasonable. Increasing the department's tenured and tenure-track faculty numbers will help to address two concerns: a) the low probability that a

student taking a mathematics course at CSUF has a full-time tenured/tenure-track faculty member teaching the course (reported as 33% by the Self Study report); and b) reduce the high service workload for faculty who monitor and evaluate lecturer performance each year.

It is imperative that the Department continues with its hiring (having added 12 tenure-track faculty in the 8 years since the previous PPR) and develops a prioritized plan for accelerating future hiring that considers additional “creative” solutions to the challenges of identifying strong hires such as the possibility of targeting mid-range hires, strengthening pipelines for outstanding Masters candidates to pursue a Ph.D. (and possibly return as a faculty at CSUF), and establishing linkages with large doctoral programs for recruitment purposes. Prioritizing the areas of mathematics for development within the department will be an important task that should involve the entire department with a long term view of the department’s composition, maintaining programmatic diversity (pure mathematics, applied mathematics, statistics, and mathematics education), how best to meet the needs of constituents served, and use the resources available for faculty to meet the requirements for tenure and promotion.

B. Revision of Department Personnel Standards to Add Clarity

The Department of Mathematics has personnel standards for tenure-track faculty, full-time lecturers, and part-time lecturers. There were comments from members of each of these groups suggesting that the department’s standards were inconsistently applied in evaluations, perhaps indicating a need to better clarify these standards both within the documents and among those faculty serving on the personnel committee.

C. Increased OE&E money to the Department (more flexibility)

Recent budget cutbacks at the campus level and fiscal policy changes at the college level have led to constraints being placed on the amount and nature of funds available to the Department of Mathematics. As the largest department in the College (and on campus), Mathematics serves a significant proportion of the CSUF student population. In order to do this well, there is a need for flexibility in their access to and use of financial resources. It is recommended that present funding policies be revisited with the intent of allocating resources to Mathematics proportional to their needs. Faculty report that funding for professional growth activities is good but it was reported that funding for faculty advisers to accompany students who are presenting at conferences is not available. The department should review its policies on supporting travel for this situation or else raise this issue with the university administration.

D. Continued Commitment to Communication, Civility, and Collegiality

With a broad interest in mathematics as well as specific specializations within the field of mathematics, it was observed that communications among faculty were generally collegial but some issues are developing because of budget cuts and space issues and should be addressed. A small number of faculty expressed that they were unsure how to raise an idea or concern to the department as a whole. It is suggested that when formal meetings are held the department utilize a recognized protocol (or remind faculty of existing procedures) to help constructively structure discussion and decision-making. One faculty member noted that he/she does not know many members of the department except the few that have offices in the same corridor. Presumably this is a problem created in part by the space issues. This specific problem might be addressed by having a few informal events (like a pizza party) during the year. It was also raised by the full-time lecturers that they are not treated as well as they were a few years ago. This seems to be due to the tighter budget conditions that have resulted in part-time lecturers having an increase in contact hours and a decrease in other assignments. Again, a specific meeting with the lecturers to explain the consequences of the budget cuts might be helpful and should take place given the proposed cuts to the CSU. There should also be some official way to effectively communicate with the majors. For example, some students noted that research opportunities were not well advertised (there are usually several REU opportunities in Southern California) and they were not aware of local meetings of the American Mathematical Society and the Mathematical Association of America. The remark regarding student research does seem to be a direct contradiction to what is written in part IC and we encourage the department to investigate this disconnect further as to whether the dissemination of research opportunities is widespread.

E. Space Issues (offices; student common areas)

The Department of Mathematics has its main office on the 1st floor of McCarthy Hall (MH) that is shared by the Chair, the Coordinator, two full-time office assistants, and the mailroom. It is very cramped quarters for 5 full-time employees who often must share it with continued traffic of faculty and students coming and going. In addition, faculty and lecturer office space is dispersed across 4 different floors in MH making collaboration a challenge. Finally, space for student study is limited both physically (there is only 1 such room for open study) and temporally (building is locked up after-hours). Since similar issues were raised in the 2002-03 PPR several mathematics education faculty were placed in offices in MH 380 suite and this has allowed for better collaboration. It appears that the department's space issues will remain a challenge for at least another ten years until a new science building comes on line.

F. Integration of Student Learning Objectives for Mathematics in All Concentrations

Substantial progress has been made in incorporating opportunities to attain “mastery” of the student-learning objectives into the coursework for each of the undergraduate concentrations. However, assessment of the SLO coverage revealed some areas in which coverage needs to be extended to include the “Mastery” level. Specifically, there needs to be an effort in the Pure and Classical concentrations to a) increase students’ learning about using technology tools to investigate and solve problems and b) the application of mathematical knowledge from one branch of mathematics to another as well as to other disciplines. In order to address a) the department might consider explore using software such as Magma or GAP in the abstract algebra course, PARI for number theory explorations and Maple, Mathematica or MATLAB for the classical applied mathematics concentration.

G. Staff Considerations

The department is clearly understaffed given it has 29 tenured/tenure-track faculty and about 60 part-time faculty, and serves so many students. With the MS program in Statistics starting up, a higher workload for the office can be expected. The staff state that they are getting by but that many less essential tasks are being put off. We recommend that another ASA be hired.

Reviewed Materials

Department of Mathematics Personnel Evaluation Guidelines

Mathematics Department Space prepared by the department chair

Department of Mathematics Program Performance Self-Study 2010-11

Department of Mathematics Program Performance Self-Study 2002-03

Mathematics Department Program Performance Review- 2002-03 Final Report