April 1996
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Response to AIM ONE
Program Review of Department of Mathematics

AIM 1: PROVIDE A QUALITY UNDERGRADUATE EDUCATION

A. Summary of department's accountability assessment for the review period.

Student portfolios are a central part of the department's outcomes assessment. The department developed a method that by the end of the review period included these steps:

1. Drawing a sample of sophomores and juniors from each of the four concentrations.
2. Interviewing each student, and asking the student to prepare a resume, a sample of non-technical writing undertaken during the in the past year, and a sample of theoretical mathematical work, and results from practicums, actuarial exams and/or computer programs involving mathematics.
3. Review of the resulting portfolios by the department head and committee on undergraduate instruction. Portfolios will also be reviewed by an advisory committee of alumni.
4. Survey of graduates taken every seven years (due again in Spring 1996)

The department reports that the most striking results of the portfolio review is that mathematics students obtain very little writing between freshmen and senior years. Consequently, the department obtained a National Science Foundation grant to develop a new course for mathematics education students. The course contains more writing for the pre-service teachers, who are also given opportunity to critique writing done by lower division mathematics courses. Likewise, writing assignments were increased in courses from calculus on up.

Results from outcomes assessment are reviewed twice each year by the department's external advisory committee, committee on undergraduate instruction, and faculty.

Student evaluations demonstrate satisfaction with undergraduate instruction, with between 5 and 6 out of 10 students strongly agreeing they would recommend their teacher to other students. If "strong agreement" is merged with "agreement," the figure goes up to 8 out of 10.

The department's service course load (all-University mathematics requirement as well as many courses required by other colleges) brings up to 9,000 registrations each semester. The department manages the service program and its own major program in an extremely cost-effective manner, as shown by a recent study at Texas A&M. Included in the sample were the University of Illinois, Ohio State, University of Arizona, Purdue, Arizona State, Texas, Texas A&M and Colorado State. This university had the lowest faculty salaries per math registration in the group, at $307 compared with the average of $464 (and a high of $601 at Illinois). The

Individualized Math Program (IMP) is one reason for the efficiency. Another is the use of large lecture classes (in particular M141) without recitations. The department feels that practice, while saving money, provides inadequate quality.

B. Assessment of those aspects of undergraduate education not included in the accountability assessment (if appropriate).

Placement data are incomplete, with the exception of graduates of the mathematics education concentration, 90% of whom are known take jobs in secondary instruction. Data for graduates of the other concentrations are less precise. About half the graduates of the actuarial concentration accept positions as actuaries, with the remainder joining financial services companies. Applied mathematics graduates often take positions with software development companies. Approximately 15% of graduates enter graduate school.

The department has made substantial progress in addressing suggestions made during the previous review. it has assumed a leadership statewide in the effort to improve the training of secondary school mathematics teachers, has adopted strategies for recruiting more high ability students, started development of a new generation of materials for the Individualized Mathematics program, and has responded favorably as well to other suggestions.

C. Assessment of support available.

1. Budget

Over the review period, the budget has been stabilized. What formerly was provided as one-time "turnaway" money has been added to the base. However, income formerly generated by Continuing Education Efforts (up to $80,000 a year) no longer arrives. Faculty leaves without pay (which provided flexibility in staffing) are no longer common.

2. Facilities and equipment

Office space is cramped, especially since the advent of computer work stations, with the average office size at 90 square feet. Mathematics professors do their scholarship and research mostly in their offices, without benefit of laboratories. As a result, most offices are quite cramped, and it is difficult conduct discussions with students (especially with more than one at a time). The department needs at least 150 square feet per faculty office.

3. Library and computer

While possessing computers, and having recently received an NSF grant of 25 computers for calculus and differential equations instruction, the department lacks space to locate the instructional lab that will houses the equipment. A small computing lab for faculty and students is located in an area having insufficient cooling throughout the year.

The self study does not comment on library holdings, so the presumption is that they are adequate.

4. Other

D. Future plans (goals, objectives, and resources needed in order of priority). The department seeks University and state support for consolidating faculty and programs in the remodeled Weber Building. Cost: $2.3 million.

The department seeks four post-doctoral teaching positions to help with a down-sized and redesigned M141 as well as with projected enrollment increases. Cost: $140,000.

The department seeks funding to support student-center learning reforms (hiring undergraduates to assist with small groups of large classes, the IMP program, and to provide instruction in calculator use). Cost: $80,000.

The department will continue reform of undergraduate instruction, to include more writing and small-group assignments

Reviewer's recommendations:

a. Enhance aspects of the Department programs?

b. Maintain the current level of support, or

The department's financial efficiency in offering undergraduate instruction has served it well over the review period. It has handled a large teaching load without at the same time imposing larger individual loads upon its faculty, who continue to average two courses per semester. Without new resources, it is difficult to see how that average load can be maintained. Discontinuation of the Ph.D. program, which according to OBIA figures has produced fewer than three graduates per year over the review period, would not provide major resources for reallocation, since only six Graduate II courses are offered. Moreover, the resulting in GTAs would create need for additional teaching staff.

c. Review specific program deficiencies for improvement or possible discontinuance of the program(s)?