THE CHRONICLE OF HIGHER EDUCATION

Academe Today: The Chronicle of Higher Education

The Chronicle of Higher Education
Date: March 1, 1996
Section: Opinion
Page: B1

U. of Rochester Plan to Cut Mathematics Is Recipe for Disaster

By Arthur Jaffe, Joseph Lipman, and Morton Lowengrub

Financially beleaguered, the University of Rochester recently announced its "Renaissance Plan," designed to improve the institution's quality by reducing the student body by 20 per cent and the faculty by 10 per cent, or 37 positions. Four graduate programs are to be terminated: mathematics, chemical engineering, comparative literature, and linguistics. Four others are to be reduced. The faculty reductions will occur mostly in these eight departments, through attrition. Mathematics will be hit the hardest, shrinking from 21 to 10 faculty members.

Even though more than 70 per cent of Rochester's undergraduates enroll in calculus courses, Richard Aslin, Rochester's vice-provost and dean, says: "There are other ways to service our need for calculus instruction, including the hiring of non-research adjunct faculty and/or the redirection of other qualified faculty from other disciplines."

The plan to downgrade mathematics at Rochester has produced an extraordinary wave of protest, not only from mathematicians, but also from well-known biologists, chemists, computer scientists, economists, physicists, and others. Four Nobel laureates have agreed to serve on a 27-member task force, with representatives from the sciences and business, formed by the American Mathematical Society to try to resolve the situation at Rochester. Four other Nobel laureates and several dozen members of the National Academy of Sciences are among the leaders in science, industry, and education who have sent letters and resolutions to the Rochester administration.

The letter writers state forcefully that advances in their fields increasingly depend on sophisticated mathematical methods, which only active researchers in mathematics can teach properly. Some characterize the plan to rely heavily on adjuncts and faculty members from other departments to teach calculus as a "recipe for disaster." Accomplished scholars in mathematics can offer students inspiration, insights, and approaches that are not available from textbooks, computerized tutorials, or even from other scholars who do not devote their intellectual lives to the discipline. The overall message is that a university cannot maintain a distinguished reputation in either research or teaching in the physical sciences and other quantitative areas without nurturing mathematics at all levels.

The letter writers and members of the task force include past and present top administrators at leading universities, people who understand how limited resources require difficult choices. Like them, we are

well aware that most universities are in stringent financial circumstances, and we applaud Rochester's creativity in confronting its problems by restructuring itself, to give its undergraduates a superior education while maintaining its character as a research university. But reducing a mathematics program of recognized excellence to the status of a service department is a bad choice. It cannot serve the interests of students or help the university's reputation. It is like deciding to lose weight by cutting off a foot.

Not all academic subjects are equal. Without mathematics, science and technology would be in a primitive state. Mathematical concepts underlie our view of the physical world, and they pervade our culture in many subtle ways, through disciplines such as economics, architecture, and even the fine arts.

Speculation about "mathematical truth" lies at the foundation of the philosophy of knowledge. Mathematics has been studied for more than 2,500 years, with an exponential rate of progress in the past few decades. It is a universal human language: Modern scholars can still read mathematical texts written by Babylonian, Chinese, Greek, and Indian mathematicians thousands of years ago. Through mathematics, we can understand phenomena on scales ranging from the subatomic to the structure of the universe itself -- phenomena that are otherwise unfathomable.

A shrinking job market for Ph.D.'s in the sciences and technology already has reduced the number of graduate students in mathematics and other disciplines nationwide, and more reductions will certainly take place. Paring down a graduate program in mathematics is not unreasonable, but eliminating it totally at a prominent university like Rochester makes little sense.

Severe cuts in a mathematics department, like the ones planned at Rochester, are likely to drive the best mathematics faculty members to seek other jobs. New adjunct faculty members will not have a long-term commitment to the department. This is hardly a situation conducive to high-quality instruction, or to outstanding research. Nor is such a department likely to attract talented new members with fresh ideas. Furthermore, if other universities follow the lead Rochester is proposing, the consequences for the quality of American scientific and technological research over all could be disastrous.

The University of Rochester's president, Thomas H. Jackson, has rejected "the notion that tenure-track mathematicians and mathematics Ph.D. students ... are the only potential groups capable of offering high-quality mathematics instruction." Indeed, why should it be better to have courses taught by graduate students, for example, than by adjuncts and faculty members in other departments who may even have Ph.D.'s in mathematics? After all, at some institutions, departments such as business and engineering, which require students to take mathematics, already offer their own math courses.

We would argue that transmitting a discipline -- a mode of thinking, a "miniculture" -- to thousands of students is the task of a team, not of isolated individuals. If you needed brain surgery, would you rather go to a hospital with a stable surgical team run by crack neurosurgeons, familiar with new developments in their area and involved in training residents? Or to one with a team of dispirited surgeons -- many of them temporary employees -- with no high-level teaching program, and which saves money by assigning operations to surgeons who learned the basics of the brain when they were younger, but who now spend most of their time on orthopedics?

It is disturbing that Rochester made such a drastic decision about a department without the benefit of careful external evaluation. In fact, many of the letters sent by prominent mathematicians assert high regard for Rochester's mathematics department, and the administration acknowledges the presence of world-class mathematicians on its faculty.

Among the justifications given by the administration for its action are that "despite good intentions by

several faculty in Math, undergraduate instruction is less than optimal," and that "linkages with other departments and programs are minimal." The mathematics department has refuted these charges in detail, listing teaching innovations, comparing evaluations of mathematics instruction with university-wide averages, and providing specific examples of instruction linked to other programs and collaboration with faculty members in other departments.

Whatever changes are desirable in the role played by mathematics at Rochester will not be brought about by crippling the program. The mathematics department has given the administration a plan for more contact between faculty members and students, and for further links with other departments. Even if the department were cut back by 10 per cent, in line with the proposed university average, it could effectively implement this plan, preserve its existing strengths, and support Rochester's restructuring goals.

We urge the administration at Rochester to accept a limited reduction, such as that proposed by the mathematics department. We do not believe that eliminating graduate education in mathematics makes sense for any university in the front ranks of research in science and technology.

Arthur Jaffe is a professor of mathematics and physics at Harvard University and president-elect of the American Mathematical Society. Joseph Lipman is a professor of mathematics at Purdue University and chair of the American Mathematical Society's Committee on the Profession. Morton Lowengrub is dean of the College of Arts and Sciences at Indiana University, and chair of the American Mathematical Society's Task Force on Excellence in Mathematics Scholarship.

Title: U. of Rochester Plan to Cut Mathematics Is Recipe for Disaster
Published: 96/03/01