THE IMPACT OF A NEW CURRICULUM ON REMEDIAL MATHEMATICS

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1. What is Remedial Mathematics and Where is It?

"Remedial mathematics" refers to high-school level courses that are taught in
colleges and universities, and includes courses in arithmetic, general mathe­
matics, and intermediate algebra. Some universities and private colleges tend
to regard courses in college algebra and trigonometry as being remedial.

From 1965 to 1980, remedial course enrollments nearly tripled in four-year
colleges and universities, while total mathematics enrollments increased by only
52%. In 1965, remedial courses accounted for only 6% of total mathematics enroll­
ments; in 1980, they made up 15% of the total. During the same time period,
remedial courses also became more available among colleges and universities.
Today nearly half of our universities offer intermediate algebra, and over half
the public colleges offer elementary algebra. Very few private colleges offer
remedial courses.

In two-year colleges, growth of remedial courses has been even more dramatic.
From 1966 to 1980, they quadrupled and now account for nearly half of all enroll­
ments. During the same period, total mathematics enrollments doubled. [1]

A host of reasons have been offered for the growth of remedial course enroll­
ments, ranging from the influence of television to changes in family structure
and open-door admission policies. One of the most important, and infrequently
mentioned reasons, for their growth is the fact that in the 70's enrollments in
high-school second-year algebra decreased sharply, while total high-school enroll­
ments increased. [2] Thus, increases in remedial course enrollments seem to be
due in large part to decreases in enrollments of corresponding high-school courses!

2. Impact of a Redesign on Remediation

Redesign of the first two years of the college mathematics curriculum might have
a wonderful impact on remedial mathematics, for at present remediation at the
college level seems to mean teaching the same old high-school stuff—only LOUDER!
A redesign incorporating some discrete topics carefully blended with calculators
and microprocessors could go a long way toward increasing both the interest of
students and teachers in that old high-school stuff. After examining remedial
materials, one is drawn to the conclusion that remedial mathematics is remarkably
dull.
It is generally agreed that teaching remedial courses is very difficult, so difficult, that many departments assign most of the remedial load to part-time faculty. A few departments have gone so far as to seek out remediaTion experts. These experts very often are patient, high-school teachers who are not bored by repeating the same material that their students previously "missed."

Remedial courses, as well as many service courses, seem to be the stepchildren of many departments and thus not watched over very carefully. In a perverse way, such a situation represents an opportunity for imaginative teachers to transform a dull rehash into an interesting experience for both teachers and students. It seems that at present there is far more opportunity for teachers at the college level to experiment and innovate in remedial courses than there is for teachers in high schools. By comparison, the high-school curriculum seems to be locked in concrete.

In spite of the "Back to Basics" movement, there are indications of some redesign of remedial courses and service courses. Textbooks now exist with titles such as Arithmetic and Calculators, in which calculators are meaningfully integrated into conceptual development. (One may also find an abundance of conventional textbooks with misleading titles such as Arithmetic: A Calculator Approach, which hold out promises of new approaches but, in fact, contain all of the old material with an additional chapter on calculators or additional exercises requiring use of calculators.)

In a few universities, some faculty are now integrating microcomputers into finite mathematics courses. They are providing students with software to handle various algorithmic exercises such as linear programming problems with more than three variables. They claim that this enables them to more fully discuss setting up word problems, to analyze the simplex algorithm instead of struggling with messy arithmetic, and to gain more insights into real-world modeling.

It would be especially interesting to see remedial courses leapfrogging more advanced courses through creative innovations. Realistically, this is not likely to occur if present staffing practices persist, i.e., if remedial courses are staffed primarily with faculty who may not feel free to modify their courses. Since not all remedial courses are taught by part-timers, particularly in two-year colleges, there is perhaps a better chance of revitalizing remedial courses in two-year colleges than in four-year colleges. This assumes little or no change in the content of calculus, which is now the "normal" first course. If redesign of the curriculum should result in discrete mathematics becoming the normal first course, then there is likely to be considerably more pressure to modify present remedial courses.

3. Limited Opportunities for Students Requiring Remediation