Response to College Algebra Papers: Hopkins and Kinard, Fox, and Herriott

by Diane Resek

I will begin my response to the three papers by discussing some general issues that relate to all three them, and conclude with particular questions for the individual authors.

All three authors mention improved student performance as a result of new programs, but there is not much data presented. For example, Herriott describe the experiment at Mommouth University with specialized courses for students with different interests. [Herriott p. 18.] No results of the experiment are given. Fox speaks of "the success of our students in follow-on mathematics courses," [Fox p. 19.] referring to graduates of the new courses he describes, but no data is given and the type of subsequent courses are not described. Hopkins and Kinard state that "even our developmental students who do not have access to the handheld CAS in subsequent courses seem to be successful in those course." [Hopkins and Kinard p. 10.] They do not say whether the statement is based on anecdotal or numerical data. It is not that difficult to collect follow-up data on students in experimental courses at most institutions. Such data is invaluable for faculty at other institutions who are interested in adopting similar programs.

Herriott seems to agree with the position that "no concept of algebra should be taught unless it can be motivated by a problem that is likely to be part of the students' experience in the near future." [Herriott pp. 9-10.] Hopkins and Kinard and Fox do not discuss the basis for including or excluding content, although both teams advocate non-traditional curricula. In particular, both of the projects omit some traditionally taught algebraic manipulations. It would be interesting if either project used a criteria other than the one articulated by Herriott to decide what work to include on algorithms..

The curriculum developed by Fox included substantial work on statistics while the one developed by Hopkins and Kinard included none. Herriott' notes that a "*majority* of the College Algebra students will major in subjects that require the study of statistics." [Herriott p. 17.] At the same time Fox' program, which included the statistics, is a two-semester course. What should be recommended for one-semester college algebra course in terms of statistics?

None of the papers explicitly advocate models of teaching other than the traditional college lecture format. The innovations seem to be in terms of content and homework problems, or projects. A number of calculus reform projects used small group and individual work on problems during classtime. It was thought that these activities helped students acquire problem solving skills. All three papers advocate teaching problem solving skills. It would be interesting to know if the authors feel that classtime devoted to such work is needed or is helpful. Herriott discusses the need for special staffing or faculty training when new content is included in college algebra courses. [Herriott pp. 18-19.] The inclusion of non-traditional types of activities would increase problems with staffing or the need for faculty training.

The authors all discuss the varied majors of the clientele in college algebra, but little note is made of the students' reasons for taking the courses. For example, in some universities such as mine, students are required to pass college algebra courses if they have not done well enough on an entrance test. In other universities, students take the courses to satisfy breath requirements, and in still others, students are satisfying their major requirements. Their reasons can greatly affect students' attitudes toward the course and should be taken into account when presenting indicators of success.

Some questions I have for individual authors follow.

I did not understand what Herriott means when he describes the initial chapter of a reform curriculum by saying it "covers linear functions through the study of linear equations and their graphs, in various forms corresponding to the various natural language descriptions of linear relationships." [Herriott p. 11.]

I wondered whether Hopkins and Kinard were really using CAS capabilities for their project beyond say those available on a graphing calculator such as the TI-83. If their activities did need such capacities, I would like to know the context in which they were needed and how the activities added to students' understandings of concepts.

Fox's paper concludes with an intriguing comment that "our own mathematics department has unanimously endorsed a plan to move towards one four credit hour course, joining the best ingredients of the traditional and reform algebra courses." [Fox p. 20.] I would like to hear more about the course and what ingredients the department feels are best in each approach.