New Directions for Education?

The computer is changing not only how we teach, but what we teach as well.

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The typical curriculum in the average American school was originally conceived to meet the requirements of an industrial economy. Workers in that economy were required to possess basic skills, to be prompt, to work on routine and repetitious tasks, and to follow instructions.

As that economy evolved, so did the requirements of the workforce. High-technology, information industries now require workers who can handle complex intellectual tasks and who are willing to continually renew their education. Educators must consider the changes in our economy's structure and ask what changes should be made in our education system.

Much learning that we have considered basic may now be unnecessary. For example, the students of James Fey, professor of mathematics and education at the University of Maryland, use the computer program muMath[1] to perform the mechanical operations of solving equations. muMath allows students to concentrate on the thinking portion of algebra—problem formulation and solution. Fey suggests that this approach helps students better understand the subject. Even students who have not mastered the mechanical aspects of algebra are able to understand and solve problems using algebra and the computer.[2]

Some subjects that have traditionally been given lip service in the curriculum now have new relevance. Estimation, for instance, is not frequently taught or tested;[3] yet estimation skills are important in helping students judge whether or not answers they obtain are correct. Many educators feel that we should concentrate on developing thinking skills and devote less time to mechanical technique.

Adding new courses and modifying present courses are important, but if the change in our society evoked by the computer is as great as many believe, they will not be enough. The power of the computer to transform learning calls for a new view of what is still fundamental in the curriculum. The resourcefulness of educators in constructing this view will determine, in large measure, the benefits that we as a nation derive from the shift to the information society.□

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The views expressed herein are those of the author and do not necessarily reflect those of the National Science Foundation.

[1]David R. Stoutemyer, "LISP Based Symbolic Math Systems," *Byte* 4 (August 1979): 176–192. muMath is one of four computer-algebra systems described in this paper, which concludes with some observations about future implications of these systems.

[2]James Fey, "The Computer and the Mathematics Curriculum: A Force for Change," paper presented at the annual meeting of the National Council of Teachers of Mathematics, Detroit, April 12, 1983.

[3]Robert Reys, "Some Current Research in Estimation," paper presented at the annual meeting of the National Council of Teachers of Mathematics, Detroit, April 13, 1983.