

THE ROLE OF THE COMPUTER IN SECONDARY SCHOOLS

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It is now five years that stored program computers have been appearing in the secondary schools. Although local newspapers hail each new installation as a pioneering "first," the frontier days are already over. There is no question that computing, in any of its aspects, can be taught to pre-college youngsters, down as far as the sixth grade. There are still, to be sure, poorly planned experiments and attempts to label adventures with punched card equipment or various toys as "computing courses," but beyond this mishmash a pattern of solid academic courses has clearly emerged.

In most cases, high school computing courses have come about through the enthusiasm of one person, coupled with the availability of some particular machine. After one semester (during which the enthusiastic teacher has been the one who learned the most), a testimonial appears that says that the approach used was the correct

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one (since many of the students actually wrote routines) and the choice of machines was the best possible.

There are only a very few cases on record of a planned approach, with thought given to a rational choice of machine.

Now, I am personally convinced that the movement of computers into the high schools is not only inevitable but also good. We couldn't stop it now if we wanted to. Many reasons have been advanced to justify having computers in high schools. I would like to list eight of these reasons, including a few that have not been explicitly stated before.

1. The computer can be used to teach something else, like arithmetic, algebra, or electronics.
2. The computer is becoming a necessary tool for school record keeping (attendance reporting, class scheduling, payroll, etc.). If we can tie an academic tail to this dog, the necessary tool can be acquired sooner and justified to the taxpayer easier.
3. Some 500 colleges now have computing facilities. In some cases, notably engineering schools, computing is now a required subject. Computer training in high school is thus a logical college preparatory subject.
4. Despite its age--computing is pushing its second decade--the subject still has glamor and some of the attributes of a fad. Our school systems cannot overlook any fad.
5. Because of its glamor and expense, a computer is an object of high prestige. From a cynical point of view, a glittering new computer diverts attention from poor

teachers, shabby textbooks, and the hole in the roof of the auditorium. This is, of course, the worst possible reason for acquiring a computer, but I'm afraid it's real.

6. The propaganda designed to sell the New Mathematics contains a theme, "This is good, because it's tied to computers" (though the tie is tenuous indeed). This nonsequitur may be turned around, so that computers are touted as being good because they're tied to the New Mathematics, which is even shadier.

7. On the theory that computers are an important and significant part of our technological world, they are worth studying for their own sake. The day is in sight when all educated persons must have some familiarity with them, and "all" includes those whose formal education ends at the 12th grade.

8. Finally, it may be that education in problem solving (a la Pólya) is what we really want to teach, and for this the computer is the ideal tool. It behooves us, then to begin this education early--certainly long before graduate work.

There is the list. Some reasons are good, some are valid, and some are shameful. My personal conviction is that entry via the record-keeping door will predominate for some time. It is too early to freeze a curriculum in computing, but it is not too early to establish our goals and to start moving toward them. In the particular atmosphere in which we meet, the tie between mathematics and the computer is obviously the most appealing. It may well be that the paramount role for the computer is as a mathematical tool. If this is so, then we must decide

where it fits among the other courses, what it displaces, if anything, and what should be done with it.

Around the IBM 1620 computer, nine textbooks have been written of which at least five are suitable for the secondary schools. Many good films have appeared to supplement high school teaching. Prices of various suitable machines continue to fall. Provided we can train the teachers, conditions would appear ripe for an orderly influx of computers into our nation's secondary schools.