A few weeks ago my younger son graduated from South Eugene High School. The school has made a lot of progress since I graduated from it 33 years ago. My son took four years of Japanese, a year of calculus, an advanced placement history course, and a couple of computing courses which included Pascal and some robotics. I didn't have the opportunity to take any of these courses because they were not offered when I was in high school. It is clear to me that my son had richer educational opportunities than were available to me.

South Eugene High School is one of the top high schools in the nation. Its music and athletic programs are large, varied, and excellent. It has an award-winning journalism program. Each year the school has a large number of National Merit Scholars. South Eugene's motto is "Strive for Excellence," and many students follow this motto.

As I watched the graduation ceremony, the "excellence" motto kept going through my head. But then I started thinking about the opposite of excellence—that is, mediocrity. I started thinking about the various reports on my nation's educational system that I have read in recent years. These reports compare United States students with those in other nations, and they compare our current schools with those of several decades ago. The comparisons suggest a rising tide of mediocrity!

Finally, I started thinking about computers and whether they are contributing toward improving our educational system. Our precollege educational system has spent well over two billion dollars for computer hardware and software. We now have about two million microcomputers in our schools, or about one microcomputer per teacher. Hundreds of thousands of teachers have received some computer-oriented inservice training. Surely we should be able to see that computers are helping to improve our educational system. Perhaps computers can help stem the rising tide of mediocrity.

The question of whether computers are helping to improve our educational system is a difficult one. For example, suppose that we use computers to help students learn to do arithmetic with fractions. Perhaps a certain piece of CAI courseware helps students learn fractions better and faster. Can we say that education is better because of this?

I would argue that it is worse! We would be better off if we realized that calculators and computers obviate the need to have students learn to do any but the most rudimentary arithmetic operations on fractions. We could drop most of this topic from the curriculum. The time and the computer resources saved could be spent on some topic more relevant to our Information Age society.

I often challenge my students and colleagues to provide me with convincing arguments that computers are helping to improve our educational system. Many of the arguments that they come up with fall into three relatively distinct categories.

First, there are the arguments that students are becoming more computer literate. Large numbers of students have learned to use some computer application software such as a word
processor or a database. Many have been exposed to some computer programming. Millions of students have gained some knowledge and skills that educational leaders deem important.

This is an important type of argument. Our school system is addressing the general issue of computer literacy. While definitions of computer literacy and levels of success vary considerably, it is obvious that current students have computer-oriented opportunities and experiences that were not available to most students even a half dozen years ago. Education is better because it is offering these opportunities that we feel are appropriate to an Information Age society.

A second type of argument tends to focus on computer-assisted instruction. The research suggests that in a variety of CAI environments many students learn faster and better. The amount of CAI material that is available is growing quite rapidly, and its average quality is slowly increasing. While I agree with this argument in principle, there seems to be a considerable gap between the potential and the actuality of CAI. I see many examples of mediocre CAI materials and I see much of the materials focusing on lower-order skills. I am not convinced that current uses of CAI are significantly improving our educational system. Over the long run, CAI faces a number of large hurdles. Widespread use of CAI could contribute to individualization of instruction and to mastery learning. It could change the role of many teachers from deliverer of information to facilitator. It could promote cooperative learning or it could help promote a decrease in cooperative learning. Our educational system is having difficulty in even having open discourse on some of the changes that widespread use of CAI might bring.

A third type of argument focuses even more broadly on computers as a change agent. Computers have brought renewed educational enthusiasm to many educators. Computers have led us to question the effectiveness of many of our educational instructional practices. Thinking of the computer as a tool brings into question substantial portions of our curriculum content. This questioning may provide a foundation for improving education.

I like this type of argument and often use it myself. But as with CAI, there is considerable difference between the potential and the actuality.

Our educational system has tremendous resistance to change. My personal opinion is that we still have an educational system designed to meet the needs of an Industrial Age society even though the Information Age began in the United States more than 30 years ago. I see little evidence of change in the basic nature of our school system to reflect changes in transportation, communication, media, and the capabilities of computers.

The above exercise can be continued. For each argument suggesting computers are improving our educational system one can counter with suggestions that maybe this is not the case. A key issue is what arguments are not being put forth. Few people suggest that we have adequately revised the content of the mathematics curriculum to reflect the capabilities of the computer as a tool. The same failing is noted in almost every part of the curriculum where computers can solve many of the types of problems being studied.

My personal opinion is that the issue of whether computers contribute to excellence in education remains in doubt. It is not inherently true that increased use of computers in schools will improve our educational system. Indeed, I see disturbing signs in certain cases that computers may be contributing to a decline in the quality of our educational system. Moreover,
resources being put into computer hardware, software, and staff development are being diverted from other potentially more fruitful uses.

This is the first issue of The Computing Teacher for the academic year 1987-88. The start of a new year is a good time for a New Year’s Resolution. I have made one. In my work as a computer educator, I resolve to strive for excellence in education. This means that I will work hard to improve our educational system and I will work hard to improve myself as an educator. I will challenge mediocrity in my students and in our educational system. I hope that many of you who read this editorial will join me in a quest for excellence in education.

**Retrospective Comment 8/26/08**

Twenty years have passed since I wrote this editorial. I am still doing a lot of writing. This gives me the opportunity to compare what I was saying 20 years ago with what I am saying today.

Information and Communication Technology (ICT) has made tremendous progress during these 20 years. This progress has contributed substantially to what Thomas Friedman calls “Flat World.” The world’s population has increased substantially, and the problems of sustainability are becoming both more evident and better understood. We have cell telephones in use throughout the world, with annual production of now close to one per every six people. We have the Web—by far the world’s largest library being made routinely available to a steadily growing percentage of the world’s population.

On the other hand, we still have AIDS and many other terrible diseases. We still have wars among nations, wars within nations, and lots of poverty.

Somewhat surprising to me, educational systems throughout the world have been only modestly affected by ICT. I find it difficult to provide good example where there have been large improvements in some parts of our educational system through or because of improvements in ICT.

What would constitute such examples? Well, consider having worldwide free high quality Computer-Assisted Learning materials that covered the entire PreK-16 curriculum. Consider having authentic assessment that includes open computer and open connectivity. Consider having education systems that are designed to meet the individual needs and interests of each student and that empower every student. We now have the ICT as well as educational knowledge and skills to be making rapid strides toward achieving such goals. However, our current rate of progress seems slow to me.