The Technology in Education Problem: Schools Can't Solve It Alone


This year's editorials all focus on one specific problem—the inability of our educational system to adequately deal with the very rapid Information Age changes that are occurring throughout the world.

Formal and Informal Education

We all know that much of what a person needs to know in order to function well in our society is not covered in our formal system of schooling. Historically, schools were designed to focus on the types of knowledge and skills that could not be readily learned through being a member of a family, church, and community.

Over a period of many years, a balance developed between what was expected that children would learn in school and what was expected that they would learn outside of school. This balance worked reasonably well for many years, and it is only in recent years that it has fallen apart.

A key component of the balance was the roles that the family unit could play. Rapid changes in technology and rapid changes in our social structure have dealt the family-as-educator component two serious blows. The family unit itself has changed significantly, and the technological knowledge of the average family unit has not kept pace with changes in technology. (The great majority of adults cannot program the VCR or the microwave oven in their homes.)

As the informal component of our educational system has become less able to carry its share of the load, more of the load has been transferred to our formal educational system. However, for the most part, our teachers are ill equipped to deal with the problem. It is one thing for a parent to acknowledge that they cannot program a VCR. It is another thing entirely for a teacher to acknowledge that they lack the knowledge and skills to help their students learn vital components of the curriculum. But, that is exactly the situation we are in. (How many of your fellow teachers know how to use the memory features of a handheld calculator? Can they carry on a learned discussion on the capabilities and limitations of computers in solving the problems in the discipline areas that they teach? Can they work effectively with students who want to learn to communicate in a hypermedia environment?)

School-Based Approaches

Our educational system has dealt with considerable change in the past. Here are eight standard approaches that are often used. These approaches are not specific just to technology.

1. Make schooling mandatory and increase the number of required years of schooling. Make the school day and the school year longer.
2. Increase the breadth/variety and depth of available schooling. Offer more courses designed to meet the specific needs of various groups of students.

3. Increase educational and other requirements to be a teacher; increase the specialization of teachers. Provide more inservice opportunities and/or require more inservice.

4. Establish higher standards for students; assign more homework; require students to pass standard exams in order to move on in school or to graduate.

5. Provide teachers and students with more and better materials and aids to teaching/learning.

6. Restructure the content and the methodology of the curriculum. Develop a district plan for achieving the desired educational change. This plan might cut across several curriculum areas, such as in "Writing across the curriculum."

7. Increase the number of teachers and teacher's assistants. Provide a high level of specialized instructional assistance in needed situations, such as in special education.

8. Provide schools with modern equipment; make use of computer-assisted learning systems.

Likely you can name other approaches, but these eight suffice for the discussion at hand. Each can be examined for its potential in helping schools cope with the technology-oriented learning needs of their students. Each can be analyzed for cost effectiveness in producing the results we want.

Perhaps the most interesting thing about this list is that individually and in various combinations, all of these approaches have been tried. Depending on the standards for student outcomes that one wants to set in the field of computer-related technology, it can be argued that seldom has there been success. I am unaware of any place where there has been success that has been achieved in a cost-effective manner and in a manner that can be scaled up to meet the needs of a state, province, or nation.

This is not surprising. The computer is a general-purpose tool, with many similarities to reading, writing, and arithmetic. Schools have been designed to help students gain a functional level of knowledge and skills in the three Rs. The home and other informal educational systems have been able to contribute substantially in this endeavor. There is nothing comparable to this for technology in education.

Don't Give Up

It can be argued that the schools, by themselves, will never be able to provide a satisfactory solution to the technology in education problem. Certainly, if the problem is going to be solved by the schools alone, the solution lies many decades in the future.

That does not mean that we should give up on the approaches 1-8 given above. Indeed, many of these are crucial to ultimate success. However, what it means is that we need to place a great deal of attention on what our informal educational system can contribute. We need to seek out components of our informal educational system that are particularly suited to addressing the
technology in education problem. We need to develop additions to our informal educational system. These ideas will be discussed in a future article.