What is the Information Age?


Many people like to talk about how rapidly computers and computer technology are changing. They make fun of efforts at long-range planning, suggesting that such plans will be out of date in a few months. However, Naisbitt (1982) and Naisbitt & Aburdene (1990) argue that one can identify major, long term trends, and that planning can be based on these trends.

John Naisbitt characterized the Information Age by a major change in the nature of employment, with a steady increase in the percentage of information processing and service oriented jobs. According to Naisbitt, the United States officially entered the Information Age in 1956 when the number of white collar workers first exceeded the number of blue collar workers.

Actually, 1956 was merely a year of continuation of a number of related trends, including rapid improvements in telecommunications, transportation, and computers that had been going on for many years and are still continuing even now, 35 years later. It is these trends that have changed the nature of employment and the demands being placed on the citizens of each nation. These trends underlie the need for school restructuring.

**Telecommunications**

We are witnessing a remarkable growth in one-way and two-way telecommunication systems that link people and machines throughout the world. Every year sees advances in cellular telephones, communication satellites, electronic mail, fax, fiber optics, and other telecommunications technology. Each contributes to making the world "smaller."

Increasingly, the work force of a corporation is distributed throughout the world. These employees routinely communicate with each other using a full range of telecommunication facilities. Cooperative problem solving, where the people who are cooperating may seldom meet each other face to face, is a rapidly growing trend.

Another key aspect to telecommunications is access to information. Some of this information changes nearly second by second, such as available seats on the world's airlines. Other parts of this information grow rapidly but periodically, such as the accumulation of published research journals.

The educational implications seem clear. Students need to learn how to make effective use of these telecommunication systems as an aid to communication, information retrieval, learning, and problem solving. This means that such facilities need to be readily available to students and educators. Both students and educators need training in the use of such facilities. Much of this can be done in a "learn by doing" mode, through integrating use of such facilities throughout the curriculum.

**Transportation**

World trade is steadily increasing. Goods and services, as well as people, are increasingly on the move. The trend is clearly toward a global economy and a global work force.
Workers throughout the world are increasingly competing with each other. There are many goods that can be produced in almost any country and cheaply shipped to other countries. Thus, production is apt to occur at the most cost-effective site. For example, the branch offices of an insurance company may gather together paperwork on insurance claims and transport it to a central site for processing. For a multinational company, the central site may be in a country located far away from most of the local offices. The central processing site is selected on the basis of a stable, reasonable cost, and well-educated work force.

Computers: Visible and Invisible

A computer is a tool designed to aid in the processing of information. The tens of millions of computers and computer terminals sitting on the desks of workers throughout the world provide visible evidence of the value of this tool. In addition, computer circuitry is now commonly built into the products and tools used by consumers and workers. Worldwide production of integrated circuits now exceeds a half dozen circuits per person per year.

It is clear that educational systems are attempting to deal with computer-related technology. In the United States in recent years there has been a steady growth in use of computer-as-tool and of computer-assisted instruction. The average number of microcomputers in schools is now approximately one per 12 students. Handheld calculators are gradually being integrated into the curriculum. Many school districts provide calculators to students, and testing services are making progress on developing assessment instruments in which students are allowed to use calculators.

Recommendation

Our educational system has no control over the change forces that are fueling the Information Age.

It seems evident that these changes present a massive challenge to our educational system. Students need to receive an education that prepares them to compete in the worldwide job market. Students need to learn, and to learn to learn, in an environment in which telecommunications and computers are ordinary, everyday tools. School restructuring must include a major focus on using such tools for understanding and solving the diverse problems faced by the adult citizens of our nation.

References


Retrospective Comments 5/5/00

Nowadays we take fiber optics and a rapid pace of improvements in telecommunications for granted. Such has not always been the case. Fiber optics was initially developed in the early 1970s. That was about the time the first microcomputers were being built, and it was before the time of the first "personal" microcomputers such as the Apple I and the Commodore Pet.

A short, free, self-instruction course on fiber optics is available at:

Moore's Law has proven relatively accurate in predicting the pace of improvement in Central Processing Unit speed for microcomputers, with a doubling approximately every 18 months. Bandwidth available through fiber optics has also followed an exponential rate of improvement. Thus, 1991-92 discussions about computer hardware and about telecommunications can easily be quite out of date a decade later.

This specific editorial recommends that students learn about problem solving for life in a world of connectivity and of computers. Students who gained such knowledge and skills during the early 19090s have been well served by their efforts. And, these educational recommendations are still important.

During the past decade, there has been a huge increase in the number of integrated circuits being manufactured per year, and the power of these circuits. For the year 2000, estimates appearing in a recent issue of Business Week are that 135 million microcomputers and 350 million digital cell phones will be manufactured on a worldwide basis. That is about one microcomputer for every 45 people on earth, and one cell phone for every 17 people on earth.

An extensive history of the telephone, including cell phones, is available at:

The Telephone [Online]. Accessed 5/5/00:

Mobile phones first came into use in the US in approximately 1947. But, the cell phone as we know it did not become available until the early 1980s. One very important aspect of cell phones is that they have allowed many countries to just skip over the "copper wire, landline" technology. This is an interesting development. The cost of a landline infrastructure is beyond what many countries can afford.