JULY 1980

COMPUTERS IN EDUCATION (p. 9) “Computer education and the appropriate uses of computers in education represent two especially critical areas of concern in what is rapidly becoming a computerized society. Last month, in the first two-part series on the impact of computers in education, we presented its philosophy and structure in a more extensive introduction; we also addressed the first concern—better training of computer professionals—with four articles that focused on curriculum issues. This month, we concentrate on the use of computers in education.”

MICROCOMPUTERS (p. 11) “Microcomputers will change the way we will teach in the next decade as well as what we will teach. Most schools, and many individuals, can now afford microcomputers. All across the country, exciting educational applications are cropping up. (The ubiquitous pocket calculator, by dramatically speeding up calculations, has raised the question whether children still should be taught long division. It will be even more difficult to answer such questions when microcomputers are everywhere.)”

FRENCH SCHOOLS (p. 21) “… It has been said that CAI [computer administered instruction] has the potential for tremendously improving the teaching/learning process—provided it is used at the right place, in the right amount, at the right moment, and in the right way. This implies that CAI is effective if, and only if, it is used by experienced teachers. CAI can become almost useless—if not harmful—when used improperly. For this reason, the training of teachers in CAI has, since the beginning, been the major preoccupation of those people in France who are responsible for the introduction of CAI into secondary education.”

SCIENCE EDUCATION (p. 26) “… there is a fundamental incompatibility between the US educational system and most proposed educational technology systems. People in school systems view educational technology as a threat rather than as a way to improve the quality of the learning environment. Hence, we need to explore ways of introducing educational computing through nonschool institutions such as the home, the museum, the library, and the workplace, and we must devise an effective and nonthreatening technology for school use.”

COURSEWARE DEVELOPMENT (p. 34) “… what we need is a level of quality that can compete directly with commercial television for our students’ time. “We have the instructional media and computer technology to accomplish this goal. What we lack is the front-end investment to develop the product and the time to cultivate market acceptance. Teachers still see this technology as a threat to their jobs. Rather than soliciting their help in solving the relevant educational problems, we have alienated them needlessly by implying that computer-based instruction will eliminate the need for their services. This is simply untrue. Teachers are needed to develop and produce new, better, instructional materials. The process of wide-scale implementation of computer-based instruction is evolution, not revolution.”

AN AUTOMATIC DICTIONARY (p. 35) “Developing a digital system that contains, as its data base, a standard dictionary of the English language poses some interesting educational questions and provides fertile ground for new ideas that can aid in vocabulary development and improvement of reading and writing skills. Two advantages provided by using an automated dictionary instead of a dictionary in book form are that the user-interface will provide a simpler means of accessing dictionary entries and that the device will provide a set of search capabilities and games enhancing the usability of the dictionary.”

GRAPHICS ARCHITECTURE (p. 68) “The flexibility of structuring one’s own building blocks to implement a specially conceived architecture is one of the key features of the Mead and Conway approach. Their book and the courses taught from it are encouraging a rapid evolution of sharable design tools at several major universities and corporations. As a result, small groups, or even individuals, may soon be able to design, simulate, create the layout for, and readily implement new architectures. “The graphics community will benefit from this trend.”

DIGITS AND COLOR (p. 82) “The process of converting digital data to color images has also gained some acceptance in nuclear medicine, especially nuclear cardiology. When radioactive isotopes are injected into a patient’s bloodstream, they can be localized in metabolically active muscle tissue in direct proportion to the degree of local profusion. The spatial distribution of radioactivity can be detected by transducers placed over the tissue. The detectors monitor the emission count, which is transmitted as electric currents. These are subsequently converted to digital form for computer processing. The computer then translates this digital information into the form of a map which, in effect, represents a visual record of the heart’s radioactive emissions and is useful as a diagnostic tool.”

Editor: Neville Holmes; holmeswn@yahoo.com.au
SOFTWARE SLUMP (p. 17) “As the global consumer continues to pour money into PC- and Internet-based businesses at the speed of an expanding supernova, content providers are quickly falling behind in providing good programming. There are very few creative, interesting, or innovative Web pages on the Internet and even fewer clever uses of intranetworked computers. Things seem to be degrading to the level of TV.”

CYBERWAR (p. 20) “The threat posed by high-tech warfare conducted in cyberspace, instead of on the battlefield, was made frighteningly clear recently by a report stating that the US Department of Defense experienced 250,000 computer system attacks last year. In nearly two-thirds of the cases, attackers gained entry to the agency’s computer networks.”

E-BOOKS (p. 22) “A Massachusetts Institute of Technology instructor is developing an electronic book that would look like and be used like a standard book but that could be reprogrammed many times with new text.”

LANGUAGE PROCESSING (p. 28) “Interactivity has changed computing profoundly. Without it, there would be no such things as graphical user interfaces and the World Wide Web would be a much different experience. Interactivity has also influenced system development and user expectations. It changed NLP prominently and permanently. ... The goal of interactive NLP is to let humans and computers effectively and quickly communicate using natural language.”

SPEECH PROCESSING (p. 33) “SpeechActs is a prototype testbed for developing spoken natural language applications. In developing SpeechActs, our primary goal was to enable software developers without special expertise in speech or natural language to create effective conversational speech applications—that is, applications with which users can speak naturally, as if they were conversing with a personal assistant.”

TRANSLATION (p. 41) “... The technology has progressed from speaker-dependent, single-utterance, small-vocabulary recognizers (for example, spoken digit strings, as in telephone numbers or zip codes) to speaker-independent, continuous-speech, large-vocabulary dictation systems with word error rates of about 10 percent. Similar advances in machine translation have resulted in commercially available text translation products.”

ELICITATION (p. 57) “Interactive elicitation techniques let us readily acquire knowledge about different domains. When these techniques are coupled with text generation, we can ultimately simplify text composition tasks faced by all sorts of professionals.”

SMART CARDS (p. 88) “Visa International has teamed up with the three largest banks in the southeastern United States to offer stored-value cards to the four million visitors and residents expected to attend the Olympics in Atlanta this month. Stored-value cards (or cash cards) transfer stored, digital money from the card to merchants’ special terminals.”

DICTIONARY (p. 95) “The [IEEE Computer Society’s Computer Dictionary Project’s] working group has finished one glossary for each of 10 computer science areas—the mathematics of computing, computer applications, modeling and simulation, image processing and pattern recognition, data management, computer graphics, computer networking, computer hardware, software engineering, and computer languages.”

REALITY (p. 96) “While it may have been legitimate in the early days of computers to think of software as being superimposed on an existing, independent reality, today software is more and more a part of that reality. This is especially evident in the MIS domain.”

INTELLECTUAL PROPERTY (p. 98) “Companies protect their intellectual property in a variety of ways. They can use copyrights, trademarks, patents, or combinations of these forms of protection. Each provides certain types of protection for certain types of intellectual property under certain circumstances.

“Because of this, companies and individuals must carefully choose the type of intellectual-property protection they need.”

OWNERSHIP (p. 101) “Digital watermarking has been proposed as a way to identify the source, creator, owner, distributor, or authorized consumer of a document or image. Its objective is to permanently and unalterably mark the image so that the credit or assignment is beyond dispute.”

REALISM (p. 120) “… those of us with graduate degrees in computer science—in other words, most researchers—were trained to learn by reading an article or a book. That works nicely for theoretical material, but software development methods, CASE tools, and topics of that ilk cannot be fully learned by reading an article. They must be used realistically. We would be wise to remember that when we write our articles.”

PDFs of the articles and departments from Computer’s July 1980 and 1996 issues are available through the IEEE Computer Society’s website: www.computer.org/computer.