

Instructional Technologies of the Future

Richard C. Atkinson, Joseph I. Lipson

"Our instructional technologies define what kind of information can be presented and, often, what kinds of responses can be expected from students. They define what is feasible to prepare and to deliver through the educational system. Consider, for example, how the printed text defines what is taught in our schools and how it is taught."

"Print not only created the potential for dissemination of knowledge to a degree not before possible, it also created the need for a huge fraction of the population to achieve literacy and intellectual skills in ways not previously anticipated. This in turn could only be accomplished effectively through the use of the new print technology. The same process is under way with respect to computers and the related communications, image and information storage technologies. They make it possible to acquire and transform information at new levels of speed, ease and in new ways. They enable us to obtain and use new kinds of information (computer animation processes, digitally stored information, auto-correlated data, etc.), thereby allowing us to carry out more creative and problem-solving activities in the arts, in the liberal arts and sciences and in applied fields such as engineering, medicine, business, etc."

"If we simply use the new technologies as a way to improve instruction in the old curriculum we may teach knowledge and skills that have lost much of their value and importance."

quoting Atkinson (1978) -

"...research trends in cognitive psychology and instructional systems are shifting from an emphasis on effective methods to acquire facts and skills to the study and development of intelligent, knowledge-based instructional systems. Knowledge-based systems are being developed which so thoroughly 'understand' the subject domain and the student's grasp of the subject matter that they are able to assist the student to recognize, articulate, and use diverse forms of information in problem-solving environments. These developments are not simply new wrinkles in educational research, they are assaults upon the basic questions of 'What is knowledge?' and 'How is it best acquired.' These research efforts are laying the foundation for the solution of a much larger set of educationally significant problems than has ever been considered in the past."

"Many of the disciplines that concern themselves with complex human thought processes, including artificial intelligence, are now being organized into a field called cognitive science. The fact that such an integration is taking place across disciplinary lines suggests that a fruitful interaction will begin to take place between the applied field of instruction and such disciplines as psychology, sociology, anthropology, linguistics, brain science, artificial intelligence, ethology, and general systems theory."

stuff coming in the future -

- Automated Dictionaries; (NIE, 1979). Work is underway to combine the features of the word processor with access to specially prepared dictionaries so as to enhance a student's concept formation and creative expression."
- Hypertext (Nelson, 1967). The ability to include a hierarchy of levels of explanation and detail, to provide footnotes, comments by instructors, reactions by students, and access to original references makes an exciting transformation of the conventional textbook."
- Dynamic Library (Licklider, 1979). Computer-aided search through extremely large data bases."
- Spatial Data Managment. Hierarchical, 2-dimensional arrangements of data files that can be easily explored through zoom (moving to and from greater levels of detail) and scan (moving around at a given level of detail) using manual controls that require no prior experience on the part of the user (Bolt, 1979) Using this system one can engage in vicarious travel through a town such as Aspen, Colorado or explore a knowledge domain such as the animal kingdom at almost any level of detail."