

Instructional Technology—Then and Now

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The conclusions of a study on instructional technology conducted 25 years ago may still hold today. Now there is more technological flexibility and interactivity, costs are lower, and there are more choices available. But costs are still a major issue. Technology remains a powerful tool for reform at the classroom level, but bureaucratic inertia still needs to be overcome, incentives need to be changed and teachers need to be adequately trained and motivated in order for instructional technology to have a positive impact on learning.

LEARNING	
1974	1999
Students usually learned as much from an instructional technology as from classroom teaching (this applied to cognitive skills only).	This continues to be true, but there are now elements of curriculum which may be taught more effectively by technology than by conventional instruction (e.g., simulations, foreign language).
There was no general learning superiority for one type of technology over another.	This still appears to be true. However it may be that interactive technologies (e.g., Internet, CD-ROM) will be found to be more effective than traditional radio and television (but these can simulate interactivity).
The addition of another channel of instruction, for example print plus television, usually improved instruction.	Still true. Now defined as multi-channel instruction.
Motivated students learned from any instructional technology if it was competently used and adapted to their needs	Still true.
COSTS OF DIFFERENT TECHNOLOGIES	
1974	1999
The costs of instructional television (ITV) ranged from \$.015 to \$.15 per student served. The lower limit could be reached if a million students were located in a relatively small region. The costs of instructional radio were about one fifth the costs of television.	Hardware and communication costs, especially of radio and television, have declined significantly and will continue to decline.
Computer aided instruction (CAI) was so expensive that it was not feasible except on a pilot basis.	Costs of computers have declined so much that generalized instruction by computers is now feasible. Off-the-shelf software especially for drill and practice is now inexpensive. Nonetheless costs are still significant and investment tradeoffs must be made.
Inexpensive technologies, especially radio, were as cost-effective as more expensive technologies.	This is still true.

	A third media channel (Internet), in addition to radio and television, is now available with its own particular cost structure.
TECHNOLOGY FOR EXTENDING THE SCHOOL (E.G., DISTANCE EDUCATION)	
1974	1999
Students usually learned as much from distance programs as from conventional instruction.	This remains true. In addition, there may now be elements of curriculum which can be taught more effectively by technology than by conventional instruction.
These programs cost less than conventional classroom instruction.	Cost savings through distance education should be even greater than in the past.
Distance education programs offered opportunities that would normally not be available because of cost, logistics, or staffing problems. They were usually successful because separate and new institutions were established.	The increased number of instructional technology options means that there are even more opportunities than before, especially in higher education, for distance education.
TECHNOLOGY FOR IN SCHOOL REFORM AND CHANGE	
1974	1999
The high visibility of an instructional technology, when it was used to provide a significant portion of curriculum content, made it a strong catalyst for curriculum and pedagogical reform.	This continues to be true. Instructional technology can play a major role in achieving curriculum reform objectives such as increased higher order cognitive skills. Also, there is now an opportunity to make the teacher less of a provider of knowledge and more a manager of learning, increasingly focusing for example on motivation and on remediation.
To be successful, technology programs required strong support from the top, acceptance and understanding by teachers, focused usage, integration into the overall system of instruction, and phased introduction, as a means of overcoming bureaucratic and pedagogical conservatism.	These steps continue to be fundamental to ensure success of technology projects.
No direct cost savings through technology were identified.	While start-up costs are significant, there is growing evidence that total costs can be reduced through increased learning, reduced repetition, and possibly higher student teacher ratios.
There were few demonstrable effects on learning when technology was used to "enrich" curriculum that was teacher provided.	This is probably also the case now.
Conclusions	
1974	1999
The most important need for developing countries was to conceptualize their educational objectives and problems and then to choose the most cost-effective system—which could include various technologies—to achieve their goals and deal with their problems.	With the rush to introduce technology throughout and the increased number of options, the need to define educational objectives and problems before selecting technologies becomes even more important than before.

No single technology could solve all problems, and variation in learning was more dependent on how a technology was managed, organized and presented in context rather than which one was used.

This is still fundamental.

What's changed: increased flexibility and interactivity of technology; much greater choice, and much lower costs.

What hasn't changed: can't start with the technology, must start with the educational problem; costs are still a major issue; distance education works; technology can be a powerful tool for reform at the classroom level but bureaucratic inertia must be overcome, incentives changed and teachers adequately trained and motivated.