Evaluating Educational Technologies:
A Historical Context

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ABSTRACT

Our team of researchers reviewed published results from the last 15 years to compile a list of the characteristics of effective educational uses of technology. All the studies considered technical, administrative, and learning features, while more recent investigations emphasized administrative characteristics necessary to support No Child Left Behind reporting. Recommended characteristics have been similar over time with great concern that the technologies integrate into the curriculum and support professional development. The wide range of identified characteristics suggests that there is great hope that educational technology will solve many problems. Additionally, we provide a timeline of relevant historical milestones in the evaluation of educational technologies.

Keywords: authentic learning; constructivist framework; criteria; design principles; educational technology; learning environment; learning outcome

INTRODUCTION

In an effort to improve student learning, educators, administrators, and researchers over the years have sought to identify the gaps in policy, curriculum, teacher professional training, student learning needs, and classroom environments. What followed were their recommendations for closing the gaps through the promise of new emerging technologies. In the last 15 years nearly every school has completed several phases of major computer purchases, upgraded their bandwidth, and conducted professional training on the use of technology.

In this chapter we review the most relevant educational technology reports and studies of the last 15 years to gain perspective on their results and the evolution of the educational technology environment. The studies share a common feature—they include, either implicitly or explicitly, specific criteria for evaluating the effectiveness of technology or for identifying the technology features necessary for use in formal or informal education environments. For example, such criteria might include cost, ease of use, or impact on student learning.

Our analysis includes only reports and studies that issued multiple recommendations.

Each study represents a major effort or relevant perspective to our current objective of establishing design principles and metrics for choosing and using educational technologies. We briefly describe the context of each report and list its recommendations. Additionally, we provide a much longer timeline of relevant historical milestones in the evaluation of educational technologies (see Figure 1).

REVIEW OF MAJOR EFFORTS IN EVALUATING EDUCATIONAL TECHNOLOGIES

CEO Forum on Education and Technology (1996-2001)

The CEO Forum on Education and Technology was founded in 1996 and committed to a five-year partnership between business and education leaders to assess and monitor the progress toward integrating technology in America's schools. The forum published annual *School Technology and Readiness Reports.* A few of the reports focused on topics such as teacher preparation programs and professional development, but evaluating and assessing the role of technology in education was the focus of several of the annual reports.

The last report, *Key Building Blocks for Student Achievement in the 21st Century* (2001), culminated a five-year study that assessed varying aspects of assimilating technology into U.S. classrooms. This report identified four critical elements of effective technology implementation in American schools: connectivity, hardware, content (to allow integration of technology into the curriculum), and professional development.

The investigation reported several other key findings, most importantly that educational technology can improve student achievement. Assessments of scores in basic skills areas showed increases in proficiency in all areas. Eleven percent of the gain directly correlated to the technology implementation in the Basic Skills and Computer Education classes begun 10 years earlier. Interestingly, the study also found that achievement tests were based primarily on accessed state standards, and these standards generally emphasized lower-order skills. The study recommended that standards be updated to reflect the need for preparing students with the technology skills needed for the 21st-century environment.

The Milken Family Foundation (1997, 1998)

The Milken Family Foundation is a private organization whose mission statement describes its goal as "to discover and advance inventive and effective ways of helping people help themselves to…lead productive and satisfying lives." The foundation works toward this objective primarily through education and medical research initiatives.

Its report, *A Call for a National Research Agenda (1997),* is brief and, at first glance, seemingly outdated now more than a decade later. However, the essay implored the United States to outline a national agenda researching the benefits of educational technology in America's classrooms. The agenda had four tasks: (a) catalog what is known and identify significant gaps in knowledge, (b) formulate and prioritize appropriate research questions, (c) mobilize resources, and (d) disseminate results.

The significance of this report is its call for a national technology plan *almost a decade ago.* The four tasks identified are still relevant, although the substance and work of the plan would be greatly different in light of today's complex technology world.

The Milken Family Foundation's 1998 report, *Technology in American Schools: Seven Dimensions for Gauging Progress,* described learning outcomes necessary for technology to be used to its greatest educational advantage in a classroom. Effective technology should:

1.   Accelerate, enrich, and deepen basic skills.
2.   Motivate and engage students in learning.

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