ED368809 1994-02-00 Technology as a Tool for Urban Classrooms. ERIC/CUE Digest, Number 95.

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ERIC Identifier: ED368809
Publication Date: 1994-02-00
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Source: ERIC Clearinghouse on Urban Education New York NY.

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CLASSROOM COMPUTER USE TODAY

By 1992, according to a study by the Council of Chief State School Officers, more than 3.5 million computers were in U.S. elementary and secondary schools--a ratio of one computer for every 13 students. In addition, 99 percent of all schools across the country reported that they provide their students with some access to computers (cited in West, 1993).

The technological transformation of education in the United States has not been as extensive as these numbers might suggest, however. The same study found that, despite the substantial presence of technology in the schools, many students have yet to gain more than minimal access to it, often using computers no more than once a year.

Moreover, the methods and purposes of computer use often differ radically from school to school and from district to district: sometimes computer use enhances learning for all students and sometimes it simply confers a new technological sheen on the low-level programs that have long been a staple of education in the United States. In some cases, they are present in the schools but are not being used for any clear purpose at all. If, as many have claimed, computer literacy has become as indispensable for success as literacy itself, then students have a great deal to gain schools implement educational technology programs.

Educational technology comes in many forms, from pre-packaged games to word processing and graphics packages, complex multimedia systems, and telecommunications networks such as the Internet. Students and teachers may be introduced to technology via stand-alone computers in the classroom, or via vast systems that can connect them to users both across the country and around the world.

Faced with this wide range of possibilities in educational technology, educators wishing to bring computers into their schools must decide not only what kind of program to implement, but also the place that technology will occupy within their schools. They must:

* clarify the role of computers as a pedagogical tool;

* define its relationship to existing curricula; and

* establish the level of human and financial investment they are willing to make.

The people involved in making these decisions for urban schools can be quite diverse--administrators, teachers, and/or parents, among others. This digest provides an overview of computer use, and presents a few general guidelines for these decision-makers to use when implementing a technology program.

CHARACTERISTICS OF GOOD TECHNOLOGY PROGRAMS

Whatever kind of technological programs educators decide to develop, the primary consideration should be the purpose of using the technology. Jordan and Follman (1993) outline a number of characteristics of good technology programs. They should:

* emphasize cooperative learning models, allowing heterogeneous groupings of students to work together collaboratively;

* emphasize higher-level problem-solving skills while also reinforcing basic skills;

* support interactions between students and teachers rather than use computers as "teaching machines" to supplant the teacher;

* create interactive learning environments built around real-world problems; and

* be adaptable to a variety of learning styles.

In addition, as Cole and Griffin (1987) point out, it is essential that programs be designed to ensure equitable and substantial access for all students, and function as an integral part of a well-planned pedagogy.

Educators planning to introduce technology programs into their schools must also consider a number of practical matters in order for these programs to be successful. As Fulton puts it, technology requires that schools be willing to make substantial investments in time, resources, and support (1993, p. 3). On the most obvious level, for

example, someone in the school must know how to install the equipment and keep it working properly. Further, as a 1990 study by the Center for Technology in Education (cited in Fulton, 1993) found, even when teachers are not skeptical about the appropriateness of educational technology and are willing to learn, they can take as much as five or six years to become sufficiently comfortable with computers to able to use them effectively in their classrooms. Schools must be able to invest in long-term inservice training, including both formal and informal training, as well as time for teachers to simply "mess around" with the computers.

TWO SUCCESSFUL PROGRAMS

Some characteristics and potentials of educational technology can be seen clearly in the two programs discussed below. Both already have a long history of success in urban schools.

DE ORILLA A ORILLA (FROM SHORE TO SHORE)

ORILLAS as it is known has been described as a class-to-class collaboration designed by partner teachers (Sayers, 1991, p. 679). Begun in 1985, it started as a small telecommunications network linking a handful of Mexican, Puerto Rican, and Anglo elementary and secondary teachers from California and New England. By 1990, it had grown into a much larger network of more than 60 teachers and their students, who speak and write in languages including English, French, Spanish, and various Caribbean Creoles. Participants in the program use electronic mail to develop team-taught collaborative projects between classrooms in the United States, Puerto Rico, Argentina, Canada, and Mexico.

Aimed specifically at immigrant and language minority students, ORILLAS uses word processing, electronic mail, and electronic publishing to strengthen students' native- and English-language proficiency and academic achievement. It also attempts to maintain strong ties between immigrant students and their cultural heritage (Sayers, 1991; Sayers & Brown, 1991).

Like other projects using telecommunications networks, ORILLAS emphasizes teacher-student interaction, as well as cooperative and collaborative learning among widely dispersed and heterogeneous groups of students. In addition, through email, it encourages students to focus on using higher-level skills in a real-world context.

PROJECT HEADLIGHT

Where ORILLAS crosses national and cultural boundaries, Project Headlight, also begun in 1985, attempts to infuse a single school--Boston's Hennigan School, an elementary school with a predominantly minority student body--with technology.

Thanks to substantial support from Massachusetts Institute of Technology's Media Laboratory, Hennigan School's computer-student ratio is unusually high, and each participating student spends a significant portion of each day at a terminal as part of homeroom activities.

The best known--and most widely documented--program to emerge from Hennigan School is LEGO/Logo, in which students use the Logo programming language and the LEGO building bricks to design and produce functioning robots.

Because they are developed and implemented by the students themselves, all of Project Headlight's activities, including LEGO/Logo, encourage a wide range of learning styles. If students are to design their own projects successfully, they must be able to both apply basic skills and draw upon higher-order skills.

Project Headlight has also developed programs in which students in the lower grades are mentored by their older peers; in these, the older students not only act as technical consultants to their younger proteges, but also design and produce their own assessment mechanisms for testing their achievement. By using older students as mentors, Project Headlight emphasizes cooperative learning and collaboration, and encourages the development of a community of learners (Harel & Papert, 1991).

ADAPTING PROGRAMS FOR SCHOOLS

Project Headlight, with its innovative and exhaustive approach to educational technology is, unfortunately, the exception rather than the rule among urban schools. Many more projects designed for urban and minority students are currently limited to remedial drill-and-practice applications and unimaginative Computer-Assisted-Instruction (CAI) packages (Owens, 1993). For one thing, few urban schools can count on the financial and technological backing of a partner like MIT. Programs do not, however, have to be as extensive as Project Headlight in order to be effective. Individual components of Hennigan School's project--the mentoring of younger by older students or the LEGO/Logo programs--can be adapted at a relatively low cost. And a project like ORILLAS can have a considerable impact for an investment of between $200 and $300 per year per classroom (DeVillar & Faltis, 1991). In addition, many cities and states have already built substantial infrastructures to support school efforts in developing educational technology programs; for instance, New York has built a city-wide telecommunications network--NYCENET--which is easily available to all teachers and students in the city, and is linked with the Internet. Further, many private sources provide support for schools' efforts--AT&T's "Learning Network," which links geographically distant classrooms together based on similar curricula, is one example (Martinelli-Zaun, 1993).

CONCLUSION

As Fine suggests, it is no longer a question of IF school systems will make increased use of technology, but WHEN and HOW they will do so (1991, p. 9). In addition, as Hamm and Adams (1992) have emphasized, technology alone cannot solve all of the problems faced by schools in the United States; nevertheless, if schools either do not invest in technology at all or invest only in low-level remedial programs, they will leave their students ill-prepared for an increasingly technological future.

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This Digest was developed by the ERIC Clearinghouse on Urban Education, with funding from the Office of Educational Research and Improvement, U.S. Department of Education, under contract no. RR93002016. The opinions expressed in this Digest do not necessarily reflect the position or policies of OERI or the Department of Education.

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Title: Technology as a Tool for Urban Classrooms. ERIC/CUE Digest, Number 95.
Document Type: Information Analyses---ERIC Information Analysis Products (IAPs) (071); Information Analyses---ERIC Digests (Selected) in Full Text (073);
Descriptors: Access to Information, Basic Skills, Computer Assisted Instruction, Computer Uses in Education, Educational Change, Educational Planning, Educational Technology, Elementary Secondary Education, Foreign Countries, Information Literacy, Language Proficiency, Problem Solving, Program Implementation, Teaching Methods, Technological Advancement, Telecommunications, Urban Schools
Identifiers: ERIC Digests, ORILLAS Network, Project Headlight
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