Appendixes

State Activities in Educational Technology

Introduction

Historically, States have shared responsibility for the education of America's children with local communities. During the past 20 years, the State role in education has expanded. Many now establish broad curriculum objectives, set standards for teacher and student proficiencies, provide funding to schools and districts, support special projects, and monitor local performance. More recently, States have become key players in educational reform, initiating a range of policies and programs. Along with an expanded role in education overall, States have become more involved in educational technology.

In the early 1980s, only a handful of States were actively involved in educational technology. Today nearly every State is. State activities vary, reflecting the diversity of educational traditions, priorities, resources, and needs. Some States have passed specific mandates or have imposed detailed controls on teachers, schools, and districts, while others have enacted a mixture of initiatives designed to build local capacity and encourage local decisionmaking.[1] In general, State technology policies and activities are concerned with four areas:[2] 1) hardware acquisition; 2) software acquisition, evaluation, and distribution; 3) staff training and development; and 4) integrating technology with ongoing instruction.

In October 1987, OTA sent a questionnaire to the agency or individual responsible for educational technology in all 50 States and the District of Columbia.[3] By February 1988 all States responded. OTA staff also contacted State technology directors by phone where clarification or elaboration was needed. In addition, OTA examined State's written responses to *Electronic Learning*'s 1987 Survey of the States and the 1986 State Technology Profile Survey conducted by the Council of Chief State School Officers. Additional information about State technology efforts, primarily in the area of software, was obtained from data collected in 1987 by the National Governors' Association.

[1] OTA State Educational Technology Survey, 1987. *See* also Janice H. Patterson, Center for Policy Research in Education, University of Wisconsin-Madison, "Computers in Schools: State Policy Objectives and Policy Instrumerits, " unpublished manuscript, December 1987.

[2] Patterson, op. cit., footnote 1.

[3] To simplify reporting, the District of Columbia will be counted as a State in the following discussion.

Organizational Structure, Planning, and Funding for Technology

- Forty-one States have a technology division or staff position for educational technology.
- Twenty-four States have a long-range plan for educational technology and plans are under development in 13 other States (see figure A-l).
- Forty-four States allocate funds specifically for educational technology or make other State funds available (see figure A-2),[4]
- Forty-nine States use Federal funds for technology: Chapter 2 predominates, followed by Chapter 1 and Title II.
- At the local level, funds for technology are provided by the local district, State, and Chapter 2 (see figure A-3).

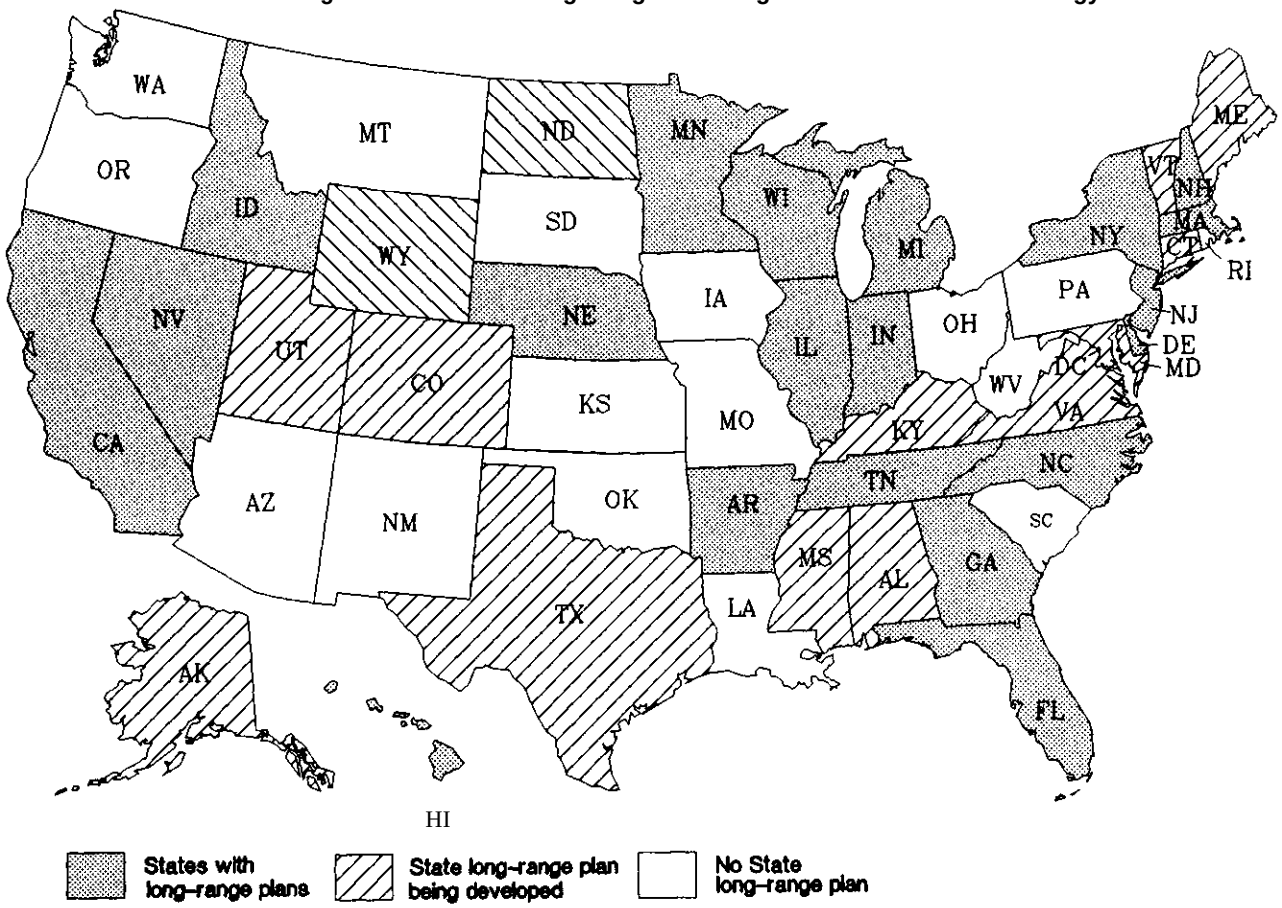
The function, responsibility, and organization of State technology divisions or staff positions vary across the country. Most are part of the State Department of Education (SDE). In some States, a consultant provides workshops and technical assistance to teachers and districts. In others, the technology division works with other SDE units to offer curriculum consultation and software preview assistance to educators. And in some States, the technology unit awards grants, provides technical assistance, and administers several separate programs.

Planning for technology is an important part of the State role. Most long-range plans and those being developed are initiated by SDEs. Others are initiated by the legislature, the State Board of Education, or in one case, a Governor's Commission. The plans reflect each State's approach to technology, educational policy and governance, and the relationship with local school districts. Some plans suggest curriculum approaches while others outline detailed strategies for implementation, or establish graduation and teacher certification requirements.

While some States have made large investments in educational technology, in most States, Federal funding, particularly Chapter 2, is an important source of support for educational technology at the State and local level. State funding for educational technology usually is mixed with finding from other sources including the Federal Government, business and industry, software publishers, hardware vendors, and private foundations.

[4] Funding is pending in two States.

Figure A-1 .—State Long-Range Planning for Educational Technology



SOURCE: Office of Technology Assessment, State Educational Technology Survey, 1987.

Funding is by no means uniform or steady. Specific allocations for technology ranged from $41 million to less than $200,000.[5] Several States provided one-time only allocations, while others have experienced serious budget reductions. Two-thirds of the States reported that insufficient funding hampered the implementation of technology. Needs mentioned were training, hardware, software, and long-term funding to allow time to implement technology and address equity concerns.

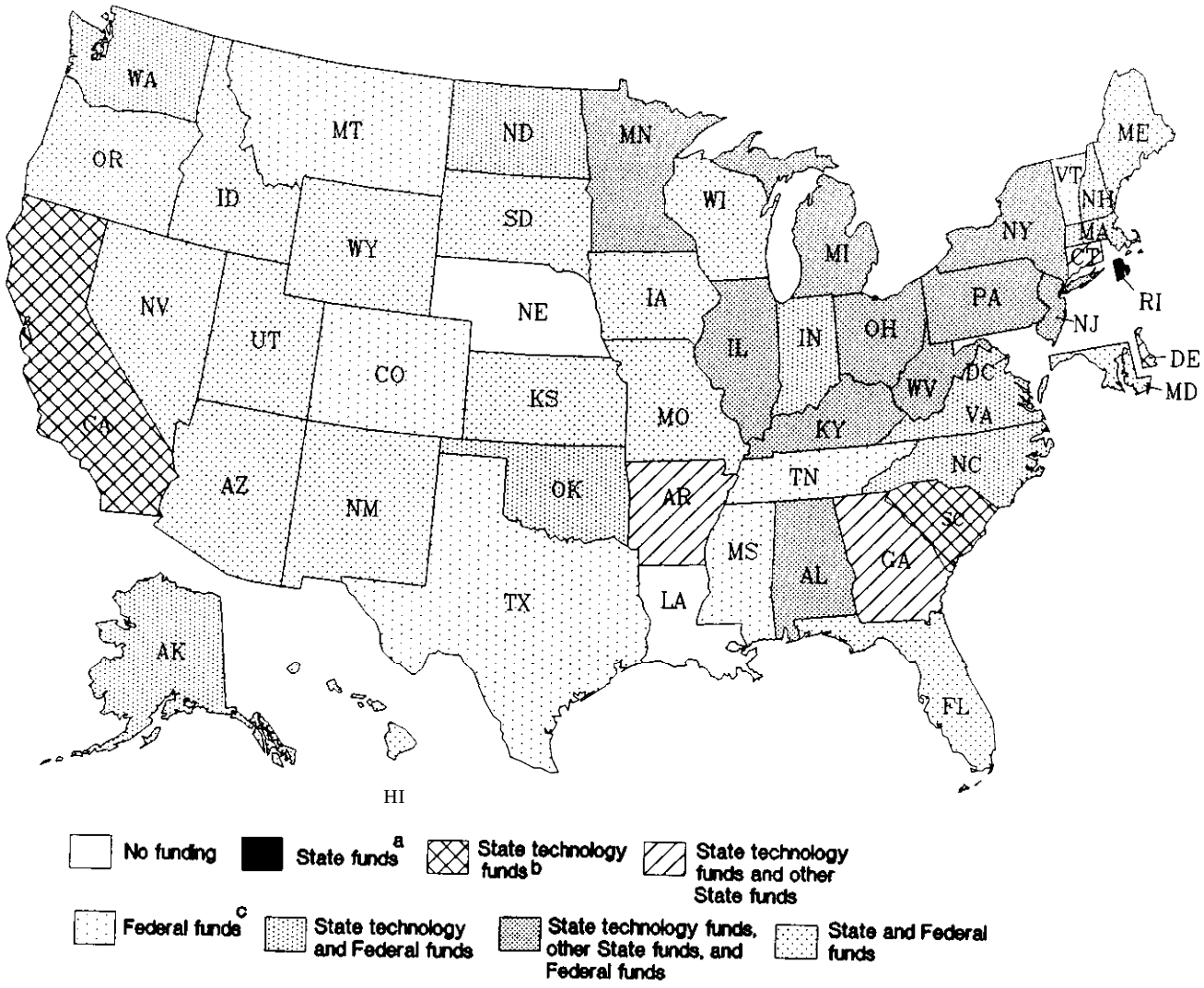
Although many States encourage wider use of new learning tools, few have sufficient resources to deal with changing technology, and even less to support a significant increase in access. States are beginning to support development and demonstration projects, but the scope of these efforts is limited. With a few exceptions, the major focus of State pilot and demonstration projects is on finding better ways to fit technology into the existing curriculum.[6]

Faced with competing priorities and financial limitations, States are taking a pragmatic approach to influence and encourage the use of technology in the schools. Most States focus resources in one or a few areas—training teachers, distributing hardware, supporting administrative uses of technology, evaluating software, and distance learning.

[5]OTA survey results reflect Information provided by respondents. In some States, particularly larger ones, accurate funding data was not available and responses were estimated.

[6]The National Governors' Association made a similar conclusion about State educational technology efforts: National Governors' Association, *1987 Followup Report* to *Time for Results: The Governors' 1991 Report of Education* (Washington, DC: 1987), p. 25. "Current state activities in the area of technology seem to be continuing earher initiatives . . . the process is characterized by adaptation and gradual growth rather than dramatic invention or Innovation. In effect, we do not have evidence that states now rely on technology in efforts to restructure their schools. "

Figure A-2.—Sources of Funding for Educational Technology at the State Level



[a]General State aid is the source of State funding for technology in Idaho, Iowa, Kansas, Nevada, Oregon, South Dakota, Wisconsin, and Wyoming. It is one of the sources of funding in New Jersey and West Virginia.
[b]State technology funding is pending in Connecticut and West Virginia.
[c]25 States report using Chapter 1 funds for technology; 34 report the use of Chapter 2 funds; and 23 report the use of Title II funds.

SOURCE: Office of Technology Assessment, State Educational Technology Survey, 1987.

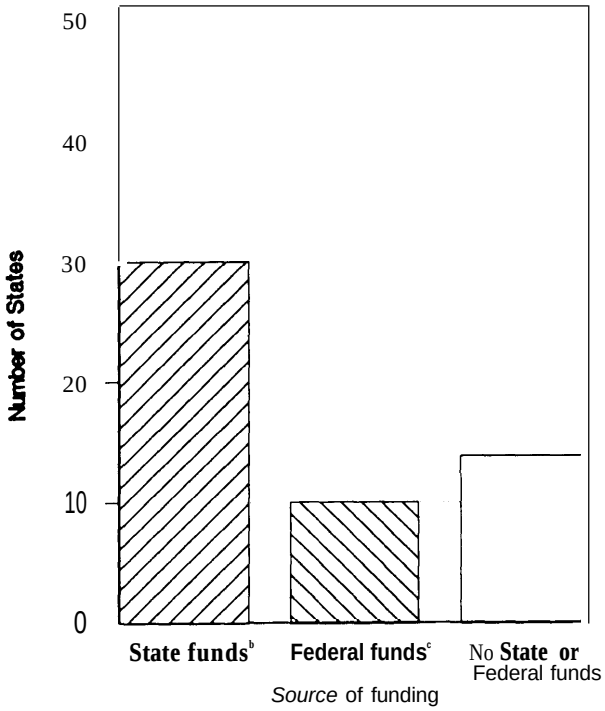
New Institutional Arrangements and Policies

Innovative policies and new institutional arrangements can support the use of education] technology. Because the size of the investment needed to implement and support educational technology programs is large, there is a need to build State, regional, and local partnerships and to enlist the involvement of colleges, universities, business and industry.

In Arkansas, for example, business and education leaders support the technology initiative. Indiana provides low interest loans to districts for hardware. And in Maine, Federal Chapter 2 funds were used to create a statewide computer consortium supported by member districts.[7]

[7]Other innovative policies and collaborative efforts are described throughout the report or are included in the following State summaries.

Figure A-3.—State Estimates of Major Sources of Funding for Technology Used by School Districts[a]



[a]State technology coordinators were asked to select the top three sources of funding used by districts.
[b]State funds used for technology by districts include: 1) funds for technology allocated to all districts; 2) grants for technology; and 3) grants that may be used for technology.

SOURCE: Office of Technology Assessment, State Educational Technology Survey, 1987.

Many of these innovative policies and partnerships suggest alternative approaches to support the use of technology in education. Through dissemination and collaboration, these creative efforts and ideas could serve as models for other States.

State Hardware and Software Activities

- Thirty-three States have developed procedures that allow school districts to purchase hardware at reduced prices.[8]
- Twenty-four States negotiate agreements with software publishers to purchase administrative or applications software at reduced prices.[9]
- Over 60 percent of the States support software evaluation activities.[10]
- Twenty States either fund or offer technical assistance for the operation or development of systems to distribute software electronically.[11]
- Thirty States are involved in curriculum development projects using commercial software.[12]
- Seventeen States fund or offer technical assistance for development of educational software."

Expanding access to technology through acquisition, evaluation, and distribution of hardware and software is a State concern. In addition, some States are playing a key role in aggregating purchases of hardware and software, either by negotiating directly with hardware vendors and software publishers, or by supporting or facilitating regional and district efforts.

States also help to provide information about software by supporting software preview, evaluation, and dissemination at the State and regional level. Some States also influence (either formally or informally) the types of software schools use through the development of curriculum guidelines or support for certain instructional approaches. With a few exceptions, the extent of State involvement in software development is limited to small scale projects.

Duplication of Effort: Need for Collaboration and Information

With each State deciding individually how to use technology, effort is being duplicated across the country. This may be especially true in regard to software evaluation and arrangements with hardware vendors and software publishers. The States share a need for more information about hardware, software, and about ways technology can be used to enhance learning in schools and classrooms.

The Software Evaluation Exchange Dissemination Project (SEED) is a multistate collaborative project coordinated by the Southeastern Education Improvement Laboratory, one of the national education research laboratories.[14] SEED facilitates software evaluation for six

[8]National Governors' Association, "Technology's Role in Educational Reform," *Capital Ideas*, July 1, 1987. Results of an National Governors' Association survey conducted in 1986-87.
[9]Ibid.
[10]*Electronic Learning*, "Educational Technology 1987, A Report on EL's Seventh Annual Survey of the States," vol. 7, No. 2, October 1987.
[11]Office of Technology Assessment, based on Electronic Learning, 1987 State Technology Survey.
[12]Ibid.
[13]Ibid.
[14]Project SEED, initiated in 1984, has passed through three phases of development, identified by changes in the project's name. The first phase, Software Evaluation Exchange and Design, involved conceptualization and acceptance of the evaluation process. The second phase, Software Evaluation Exchange Development, was a period of training and refining procedures. The third and current phase, Software Evaluation Exchange Dissemination, involves expanding to other States, increasing the number of evaluations performed, and disseminating results. A 1987 evaluation concluded that the human element is key to a successful collaborative effort like SEED and that sufficient time and resources must be allocated to develop a successful process.

Southeastern States (Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina). Over several years, SEED has trained educators and has helped participating States evaluate software and share information. Each State then distributes evaluations independently to local school districts. Several other States are interested in joining SEED and it is expected that a membership fee will be charged for States outside the southeast region.

Another effort to bring States together was initiated by the Council of Chief State School Officers (CCSSO) in 1983, CCSSO's National Technology Leadership Project, funded under a 2-year grant from the National Institute for Education (NIE), provided States on-line information about educational technology products, collected information about State activities and needs, conducted two national conferences, and began to establish links among States, Federal agencies, and other organizations involved in educational technology. Perhaps most importantly, the projects created a forum for State collaboration and discussion of major policy issues. The project ended in 1986 when the NIE grant ended.

Equity and Access

One of the main justifications for State involvement in education is to foster equal access to educational resources for all students. In some States, efforts to provide equal access to technology resulted in spreading technology thinly. For instance, one southern State's goal is to put enough computers in the schools to provide 1 computer for every 50 students. Other States address equity concerns by allocating funding for technology to all school districts on a formula basis, or setting up computer laboratories in each school that students can use for a limited amount of time each day, month, or year. States report that these approaches do not necessarily result in equal access to technology; wealthier districts continue to have more resources to use for hardware, software, and teacher training.

Several States are taking a somewhat different approach, concentrating resources and targeting specific needs of selected groups of students. Many of these States support using technology to teach basic skills to low-achieving students, or to provide instruction to disadvantaged and underserved students through, for example, distance learning. Other States implement instructional packages or integrated learning systems for certain grade levels or groups of students. Approaches such as these represent an acceptance that technology can be used for basic skills instruction with certain groups of students. They raise questions, however, about providing equal access not only to hardware, but to how technology is used with different groups of students, particular whether it is being used to enhance the higher order thinking abilities and academic performance of the disadvantaged.

Teacher Preparation, Training, and Professional Development

- Eighteen States require and eight recommend that teachers seeking certification take computer-related courses or become familiar with using technology in instruction. [15]
- Three States require and 17 States recommend some form of inservice professional development in the use of technology.
- Almost every State provides or supports inservice technology activities through a combination of ongoing activities and periodic efforts. [16]
- Over three-quarters of the States sponsor technology conferences and half support training through regional education or technology centers.
- Twenty-two States now use or plan to use electronic networks, interactive television, videotape, or other technologies to provide inservice training and assistance in the use of technology.
- Thirty-four States allocate funds specifically for inservice technology training or make other funds available which may be used for technology training (see figure A-4).[17]
- Ten States use Federal funds for inservice technology training, primarily Title 11 and Chapter 2, but also Chapter 1, vocational education, and special education funds.

Most teachers receive technology training through their district; however, the State is an important source of training programs and assistance in many States. Regional centers, often partially funded by the State, are playing a growing role in providing technology training to educators along with other education services. Funds for training, as for other educational technology efforts, vary by State and come from a mix of sources: State funds for technology training; professional development grants; funding that flows through regional centers or districts; general State aid used at local discretion; and Federal dollars (e.g., Title II, Chapter 2). Of the 20 States" that allocate funds specifically for technology training, annual funding ranges from $15 million to less than $20,000.

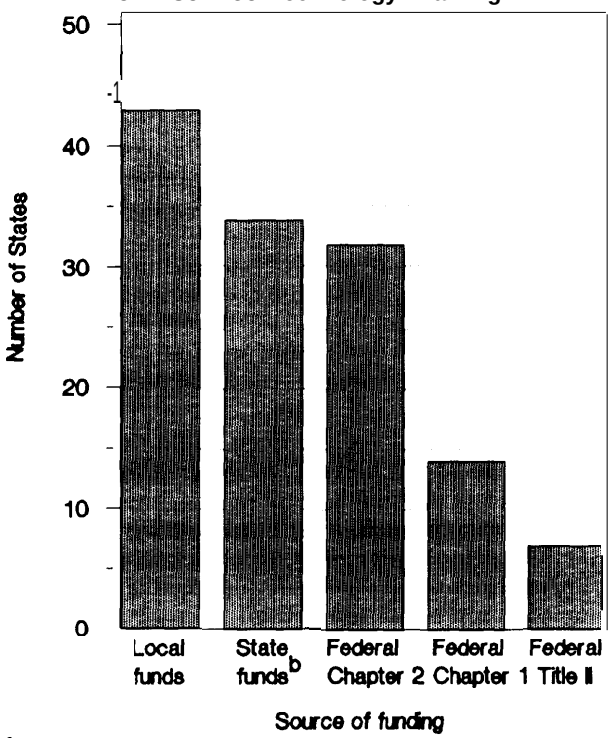
[15] In six States, these requirements apply only to teachers in certain areas such as business, computer, or media education.

[16] Some States provide training, information, consultant services, or facilitate training at the regional or local level, but do not allocate funding for technology training.

[17] State funding for technology, training in Utah is pending study and recommendations.

"Nine of these States make other State or Federal funds available as well.

Figure A-4.—State Estimates of Sources of Funding for Inservice Technology Training[a]



[a]State technology coordinators were asked to select the top three sources of funding for technology at the local level.
[b]State funds include: 1) funds for technology training; 2) Professional development funds or grants; 3) funds that flow through regional centers or districts; and 4) general State aid used at local discretion.
[c]Federal funding includes Title II, Chapter 1, Chapter 2, and Special Education funds.

SOURCE: Office of Technology Assessment, State Educational Technology Survey, 1987.

State Research, Development, and Demonstration Activities

Sixteen States fund or provide technical assistance to an educational technology project with a research or evaluation component. [19] In addition, some States report supporting demonstrations and pilot projects in the context of curriculum development or software activities. Overall, however, research and development supported by the States is limited. Most States do not have the means to fund scientific research on learning and educational technology or to develop advanced software.

Yet, State research projects are important because, for the most part, they focus on questions about implementing technology in schools and investigate the use of technology to serve defined educational needs. Some States support projects on a limited scale before a larger investment is considered, or work with vendors and the private sector to establish pilot projects. Others award grants to schools, districts, or teachers for innovative projects or school improvement which may involve technology. Some of these projects have an evaluation or research component while others do not, but in all projects technology is being used by teachers or students in a variety of "real world" settings.

Some Examples

In Minnesota, evaluations of teacher training efforts found that the most successful programs are those in which teachers work with technology-using peers. Large, one-time group training sessions conducted by vendors were found to be the least successful. Alaska sponsored two classroom-based research projects to study the use of technology in instruction. One project focused on using technology to teach writing and the other on increasing inquiry learning in science. Participating teachers were trained in classroom-based research techniques and kept journals describing their teaching experiences and observations in the classroom. [20]

Kentucky initiated Project Vision, a pilot project to develop a videodisc program to teach remedial mathematics skills in grades K-2, based on the Kentucky Essential Skills Test. The project was supported to a large extent by private donations and in-kind support from vendors.

Recently, research has begun in five model school sites in California. The goal is to study long-term effects of using technology in instruction. Annual finding for the projects is contingent on the total funds approved by the Governor for the State's educational technology activities.

Technology, Curriculum, and Educational Reform

Many States establish curriculum requirements or develop optional guidelines for districts. The current focus is "integrating technology into the curriculum;" however, interpretation of this concept varies. California, for example, supports the use of technology as an educational tool. It initiated the $2 million Technology in the Curriculum Project to help educators locate high-quality software and video programs and integrate them into the

[19]States reporting research and development activities: Alaska, Arkansas, California, Delaware, Indiana, Kentucky, Maryland, Minnesota, New Hampshire, New Jersey, New York, Texas, Utah, Virginia, and West Virginia. Additional research projects are pending in two States, Washington, DC and Florida.

[20]A publication, *Hand in Hand:* The Writing *Process and* the *Microcomputer* was published by the Alaska Department of Education in 1985 as a result of the classroom-based, Computer/Writing Skills Project. Currently, there are no State funds to publish a similar document about the Inquiry Science Project, which was funded by the State during 1986-87. The State is looking into using Federal or other funding sources. The Alaska Department of Education also hopes to use Federal funds to undertake similar classroom-based research in mathematics.

curriculum, In Delaware, on the other hand, a 1984 State plan mentions integrating technology into instruction, but is more specific about computer science and computer-assisted instruction, and the State has provided funding for these areas." In other States, integrating technology into instruction has been interpreted to mean matching software with basic skills competencies outlined by the State, or using technology to supplement the existing curriculum.

In some States, activities and new initiatives involving technology are tied to educational reform. In Wisconsin, where there is a tradition of strong local control of education, legislation resulted in new standards and a series of curriculum guides requiring changes in both the content and delivery of instruction. SDE sees technology as an important component of overall school improvement and local districts are encouraged to integrate technology into the curriculum. At the same time, no State funds have been allocated specifically for technology; instead, the State funds regional educational service centers, and districts receive about 50 percent of their funding from the State. Beginning in fall 1988, the State will try to influence districts that do not comply with the State standards, including those regarding educational technology.

Texas' approach to technology also reflects the State's approach to educational reform: the creation of specific requirements and regulations. Teachers seeking certification in Texas are required to take a course on educational computing and technology or demonstrate proficiency. All districts must teach computer competencies in elementary schools. Curriculum guidelines under development are expected to include keyboarding, information processing, and using computers to develop problem solving skills. In addition, every student in Texas must complete at least one semester in computer literacy in seventh or eighth grade. This course specifies applications, awareness, and introductory programming. There is also a separate advanced high school diploma that includes courses in computing.[22] Texas has not funded local implementation efforts but has funded several pilot projects with State and Federal dollars (primarily Chapter 2). State requirements for elementary computing and local planning have been proposed and are likely to be developed in 1 to **2** years.

Technology is changing rapidly and States have many choices about how best to take advantage of the potential of technology in education. Curriculum requirements, instructional priorities, and institutional arrangements influence how technology resources are used. States may find it difficult to change policies or encourage different instructional approaches after investing money, people, and effort. Rigid, narrow, or outdated educational policies may make innovative and effective uses of technology difficult to implement in the future. More collaboration between States, educators, researchers, and developers could help States articulate needs, identify newer technologies and instructional approaches, encourage flexibility, and influence further development.

[21] Delaware's *State Plan for the Use of Computers in K-12 Education* currently is being revised and the new version may give greater attention to the use of computer applications in regular classrooms.

[22] There are no educational technology requirements for a regular high school diploma.

State Profiles

Alabama

State position/unit: Yes (1983)
State plan: Being developed
Key actors: State Advisory Committee
Funds available through the State for technology activities: State technology;[23] State education;[24] Federal
Source of funding in most districts: State grants that may be used for technology
State training policies: None
State funding for technology training: None
Way most teachers receive training: State[25]
Most important State action: $8 million in 1984 for hardware/software
Major changes in past year: Task Force to develop State plan
Barriers: Cost; State plan

The 1984 State educational improvement plan encouraged districts to include the use of technology in grades K-12. A $12 million appropriation allocated 70 percent of these funds for hardware and software purchase. Due to a revenue shortfall, only $5 million was made available in 1985-86. Federal Chapter 1 and Chapter 2 funds were also used to purchase hardware and software in 1986-87 and 1987-88.

In 1986-87 $750,000 was allocated for a statewide telecommunications system to connect local districts and SDE. The network now connects the State and all 130 school districts. A $250,000 allocation in 1987-88 continues training and provides maintenance. Future plans include statewide implementation of a student management system to standardize scheduling and recordkeeping.

Alabama participates in SEED, a multistate model for software evaluation and evaluation exchange.[26]

[23] *State technology* funds can include State funds earmarked for technology that go to all districts or State technology grants awarded to specific projects, districts, or schools.

[24] *State education* funds can include State grants for educational improvement or reform, general State aid, staff development funds, or State funds that flow through regional centers or other entities.

[25] A State may provide training, information, consultant services, or facilitate regional activities but may not allocate funding for technology training.

[26] See discussion of **SEED** above.

Alaska

State position/unit: Yes (1980)
State plan: Being developed
Key actors: Legislators; professional teacher associations
Funds available through the State for technology activities: State technology; Federal
Source offending inmost districts: District/general State aid
State training policies: None
State funding for technology training: None
Way most teachers receive training: District
Most important State action: Establishing computer and instructional television projects (1980)
Next steps: Explore distance learning
Major changes in past year: Most funding and staff reduced
Barriers: Funding; staff; political support

In 1986, the State's satellite-based network for instructional television (ITV) (the Learn Alaska Network) was cut and staff for educational technology significantly reduced. The State now maintains an ITV support system and is planning for the use of distance delivery. An Alaska studies course is being developed for distance delivery. One pilot project uses audioconferencing and electronic mail in addition to video. The State also produces a phone call-in television series, "Talk Back," using Title II funds. The State supports a project investigating the impact of computers in science education. In previous years, several classroom-based research projects trained teachers to assess the impact of technology in their classrooms.

Arizona

State position/unit: Yes (1981)
State plan: No
Key actors: State Advisory Committee; teacher organizations; parents; district computer coordinators
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: District
State training policies: None
State funding for technology training: None
Way most teachers receive training: School
Most important State action: 1983 bill establishing State technology role and clearinghouse
Major changes in past year: None
Barriers: Lack of legislative awareness about technology

Legislation passed in 1983 defined the State role in educational technology and created a clearinghouse for software and information, but as yet, no State funds have been allocated for technology through SDE. Three staff members assist schools with volume purchases for technology and provide training, support, and software evaluation services. General education funds are used to purchase software for evaluation and preview.

The Arizona School Services Through Educational Technology Project (ASSET), operated out of the State's public broadcasting stations, provides ITV programming and support services to schools. Several instructional packages that include software are available through ASSET. Funding for ASSET comes equally from member districts and the State. Federal Title II funds are also used by both districts and the State. As schools install satellite dishes the State expects to become more involved in distance learning.

The State Computer Services Unit provides ongoing training to educators through a magnet school in Phoenix and in districts upon request. In 1987-88, $17,500 (Title II) will be used to train 200 mathematics and science educators from rural districts in the use of technology.

Arkansas

State position/unit: Yes (1983)
State plan: Yes (1984; revised 1986-87)
Key actors: Business community; Governor; Chief State School Officer
Funds available through the State for technology activities: State technology; State education
Source of funding in most districts: District
State training policies: Preservice (required for media teachers); inservice (recommended)
State funding for technology training: Yes
Most important State action: IMPAC; distance learning; vocational education guidelines; high school computer science requirements; defining levels of inservice
Major changes in past year: Increased leadership by Governor and State Education Director
Barriers: None

In 1983, the Instructional Microcomputer Project for Arkansas Classrooms (IMPAC) was created through legislation. Supported by the State and the business community, IMPAC has developed software and implemented several models of computer-managed and computer-assisted instruction combined with classroom instruction to teach basic skills. Software and lessons are linked to the State's basic skills list and costs are closely monitored. IMPAC projects have been implemented in 136 schools. Research on effectiveness identified successful models. The State's goal is to establish IMPAC programs in every school and provide training and support.

During 1986-87, nine experimental satellite education programs in secondary schools were funded and distance learning policies were developed. Nineteen districts currently offer courses by satellite with funding assistance from IMPAC.

California

State position/unit: Yes (1982)
State plan: Yes (1986)
Key actors: Business community; legislators; State Advisory Committee; Chief State School Officer; SDE Staff
Funds available through the State for technology activities: State technology
Source of funding in most districts: Unknown
State training policies: Preservice (required)
State funding for technology training: Yes
Way most teachers receive training: Unknown
Most important State action: State level initiatives in software development, summer training institutes, and model schools
Major changes in past year: Large funding cuts by Governor
Barriers: Political consensus on definition of equity; State's ability to fund categorical programs; lack of software which "compels" use of technology

Legislation passed in 1982 and 1983 defined the State's role in educational technology and authorized several large grant programs. Educators and schools were encouraged to integrate technology in the curriculum. Funding was provided for matching grants to schools and districts," statewide software acquisition and development, and for the Technology in the Curriculum Projects, an initiative to match software and ITV programs with curriculum objectives. There were also funds for Summer Institutes and videocassette recorder (VCR) distribution. Teacher Education and Computer (TEC) Centers, first established in 1982, offered information and training to educators. Fifteen million dollars was allocated for California's technology efforts in 1984-85, $25.6 million in 1985-86, and about $25 million in 1986-87. The Governor cut the educational technology budget in half in 1987-88. Budget cuts eliminated the TEC Centers and the Summer Training Institutes.

Over $1 million supported the development of six educational software programs in mathematics, science, and history/social studies in 1986-87. Under the terms of the agreement, publishers are responsible for marketing costs and will retain copyright. California will receive royalties and discounts for the software. Although less money is available for technology, there is continued interest in supporting software development in partnership with other States or educational organizations.

State educational technology finding supports a model schools program in five sites. The goal is to study the use of technology by students over a 3 to 5 year period. Sites draw on a combination of State, Federal, and industry support and universities provide assistance with research and evaluation. Annual State funding for the program is contingent on the total funds for technology approved by the Governor.

Beginning July 1988, all teachers who apply for certification must meet new State requirements in computer-related coursework.

2-Contingent on the development of a local plan

Colorado

State position/unit: Yes (1982)
State plan: Being developed
Key actors: Legislators; local Boards of Education
Funds available through the State for technology activities: Federal
Source of funding in most districts: Mixed
State training policies: None (beginning to consider)
State funding for technology training: None
Way most teachers receive training: District
Most important State action: Creating staff positions in SDE; formation of telecommunications consortium
Next steps: Legislative action
Major changes in past year: None; funding remains a prime concern
Barriers: Funding; statewide direction (local control makes it difficult)

In Colorado, where there is a tradition of strong local control of education, State-level consultants provide guidelines and assistance to schools and districts. State technology activities are supported with Chapter 2 funds. Recently, a telecommunications consortium made up of educators, State staff, representatives from business, industry, and higher education was formed to address problems faced by small, isolated school districts.

Connecticut

State position/unit: Yes (1980)[28]
State plan: Being developed
Key actors: Business community; State Advisory Committee; Chief State School Officer; teacher organizations; parents; SDE consultants
Funds available through the State for technology activities: State technology (pending for 1987-88); State education
Source of funding in most districts: District
State training policies: Preservice/inservice (recommended)
State funding for technology training: None[29]
Way most teachers receive training: Regional center
Most important State actions: Grants; training; establishing regional service centers with software preview centers; statewide electronic network; telecommunications projects

[28]Consultant position was vacant from 1984 to 1987.
[29]Other State funds for professional development are available in Connecticut.

Major changes in past year: Advisory council formed to develop State plan and funding proposals
Barriers: No instructional standards for use of computers; no training requirements; incompatible systems in schools; strong local autonomy; no funds for hardware; inequities between districts

Following the recommendations of a Joint Committee on Educational Technology, 1985 legislation created the Telecommunications Incentives Grants Program for distance learning, staff development, and on-line databases. Although $500,000 was requested for 1986-87, only $85,000 was appropriated. The State planned to request the same amount for 1987-88. Other grants are available to schools to enhance instruction and staff development involving technology, but no funds for hardware are available from the State. A State technology consultant advises schools and districts about technology and encourages the inclusion of technology in grant proposals. Technology training is available through regional Institutes for Teaching and Learning, a $2.5 million staff development effort. Connecticut has established a statewide electronic network that disseminates information about technology.

Delaware

State position/unit: Yes (1983)
State plan: Yes (1983; being revised)
Key actors: Legislators; State Advisory Committee; State Department of Public Instruction
Funds available through the State for technology activities: State technology
Source of funding in most districts: District
State training policies: None[30]
State funding for technology training: Yes
Way most teachers receive training: District
Most important State action: Creation of unit in SDE; statewide computer network; establishing statewide technology council; training
Major changes in past year: None
Barriers: Funding for hardware/software; lack of quality software that relates to existing curricula; proof that there is a need for and value to using computers in the schools

Delaware has provided funding to school districts for computer education for 15 years. An electronic network, maintained by the State links school districts. The State has appropriated funds to all school districts on a per student basis since 1984 and districts must submit plans in order to receive State funds. A 1984 State plan emphasized computer literacy, computer science, administrative, and training needs, and gave some attention to other instructional applications of computers and other technology. A new plan is being reviewed.

Three centrally-located training laboratories, established in 1983, provided training on computer literacy; training has shifted to integration of technology into the curriculum. Districts can use State funds for training. Delaware also offers scholarships for training/retraining in computer science.

A study of the use of CAI systems for basic skills was conducted in 1987-88.

District of Columbia

State position/unit: Yes (1983)
State plan: Yes (1983)
Key actors: State Advisory Committee; Chief State School Officer; school board; city council
Funds available through the State for technology activities: State technology; Federal
Source of funding in most districts: Mixed
State training policies: Preservice (required); inservice (recommended)
State funding for technology training: Yes"
Way most teachers receive training: State/District
Most important State action: Board policy authorizing first Five-Year Plan (1983)
Next steps: Development of second Five-Year Plan
Barriers: Additional funding and training to improve scope of use

A Five-Year Plan specified certification and training requirements for educators, created a central training site, and set forth curriculum mandates for grades K-12. Funding for all technology-related instructional and administrative activities is included in the District of Columbia annual school budget. Yearly expenditures exceeded $3.3 million in 1986-87 and were about $3.5 million in 1987-88. Chapter 1 and Chapter 2 funds are used to provide additional computer laboratories in elementary and junior high schools. A second Five-Year Plan for computer education is in the final stages of development.

Florida

State position/unit: Yes (1981)
State plan: Yes (1987)
Key actors: Legislators; Chief State School Officer
Funds available through the State for technology activities: State education,[32] Federal
Source of funding in most districts: District
State training policies: Preservice/inservice (recommended)

[30] A certification program for computer science teachers is pending approval. Teachers are currently taking courses for certification.

[31] Funds for training in technology are Included in the overall budget for technology.

[32] The State provided funding for educational technology in 1983-84, but no funds have been allocated since.

State funding for technology training: Yes[33]
Way most teachers receive training: District
Most important State action: Computer literacy requirement for all students in grades 3, 5, 8, and 11
Next steps: Certifying teachers in computer education
Major changes in past year: None
Barriers: Funding; legislative support; coordination between universities, community colleges, and school districts

Legislation in 1981 stated that technology should be used to enhance the learning process and reduce administrative burdens on teachers. Attention to cost-effectiveness was emphasized. In 1983-84, a one-time $10 million appropriation was given to schools on a per student basis for hardware and software for mathematics and computer literacy. Several related programs in mathematics, science, and computer education for students and teachers were established[34] **and $2 million in Federal funds were allocated for computers for vocational** education schools. These programs and several additional projects have continued to receive funding, but for the past 3 years no State funds have been allocated for educational technology. Federal Job Training Partnership Act and Chapter 1 funds are used for technology. SDE proposed that the legislature provide $10 million in 1988-89 to assist districts with implementation.

The State supports a statewide electronic network, the Florida Information Resources Network. The Florida Center for Instructional Computing at the University of South Florida places software evaluations on the network. Florida also participates in SEED.

A 1987 plan calls for technology to support basic skills in grades K-8 and for computer-supported educational and career planning systems for secondary students. A new plan is being developed to direct funds toward a model schools project, statewide acquisition of hardware, and a comprehensive mathematics, science, and computer education program.

Georgia

State position/unit: Yes (1984)
State plan: Yes (1985)
Key actors: Business community; legislators; Governor; State Advisory Committee; Chief State School Officer
Funds available through the State for technology activities: State technology;[35] **Federal**
Source of funding in most districts: District
State training policies: None
State funding for technology training: No[36]
Way most teachers receive training: District
Most important State action: Formation of Georgia Technology Council; creation of Technology Coordinator position in all schools; State grants program; specification of technology standards and program components
Barriers: Competition for limited State funds

Georgia's Quality Basic Education Act became effective in 1985, establishing several grant programs and providing funds for instructional technology and the administrative networking of schools. In 1987, $500,000 was appropriated for hardware/software purchases and teacher training to use technology for recordkeeping and instructional management. Local districts must develop plans in order to receive grants. Other services (software evaluation and dissemination, training, and technical assistance) are provided by the State and regional education centers. Chapter 2 funds were used to pilot IBM's *Writing to Read* in five districts during 1987-88.

Member districts may purchase software cooperatively through the Georgia Software Consortium. The Consortium was initiated with State funding and is now supported by local districts. State staff select software and negotiate with publishers. Georgia also participates in SEED and distributes evaluations.

A pilot study is attempting to align Georgia's core curriculum for K-8 mathematics with standardized tests, State tests, software, video, and texts.

Hawaii

State position/unit: No
State plan: Yes (1980; revised 1987)
Key actors: Business community; legislators; Governor; State Advisory Committee; Chief State School Officer
Funds available through the State for technology activities: State technology; Federal
Source of funding in most districts: State
State training policies: Preservice/inservice (recommended)
State funding for technology training: Yes
Way most teachers receive training: District
Most important State action: Providing resources to implement State plan
Next steps: Development and expansion of plan
Major changes in past year: None

[33] Summer inservice institutes have made funds available for content area, noncredit training activities.

[34] 1) Post-Secondary Programs of Excellence in mathematics, science, and computer education for teacher training and cooperative activities between universities, colleges, businesses and school districts. 2) Two Regional Centers of Excellence in mathematics, science, and computer technology to develop instructional techniques, train teachers, and evaluate instructional materials. 3) Grants for summer camps for students and summer inservice programs for mathematics and science teachers.

[35] Funding for 1987-88. No funding was provided for educational technology in 1986-87.

[36] Staff development funds may be used for technology training.

Barriers: Time and additional resources to catch up to and maintain pace with new developments

Funds for technology are allocated on a per capita basis and distributed to all districts for computer literacy, CAI, computer-managed instruction, and computer-based information retrieval. Over $1 million was allocated in 1986-87 and $1.8 million in 1987-88. All schools can apply for Chapter 2 funds. In 1987, SDE developed a framework for continued planning and State activity.

About $150,000 was allocated to seven districts for in-service training activities in 1987-88. General staff development funds also are available to all districts. Some training via telecommunications is being initiated.

Software is evaluated through a Computer Review Center and Clearinghouse.

Idaho

State position/unit: Yes (1984)
State plan: Yes (1985)
Key actors: State Advisory Committee; Chief State School Officer
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: District
State training policies: None
State funding for technology training: None
Way most teachers receive training: District
Most important State action: Slow approach has allowed users to develop necessary comfort level
Next steps: Continue current efforts
Major changes in past year: Increased legislative interest in distance learning
Barriers: High costs; rapid change of technology

State funding for technology is available indirectly through general State aid. Districts may also use Chapter 2 funds. SDE and Boise State University support a distance learning mathematics class for rural classrooms. Teacher training in technology is provided through university preservice and inservice activities and SDE-sponsored workshops.

Illinois

State position/unit: No
State plan: Yes (1985)
Key actors: Legislators; Governor; business community; Chief State School Officer
Funds available through the State for technology activities: State technology; State education; Federal
Source of funding in most districts: State grants that may be used for technology
State training policies: None[37]
State funding for technology training: Yes
Way most teachers receive training: Regional centers
Most important State action: Creating computer consortia and incorporation into Educational Service Centers
Major changes in past year: None
Barriers: No particular barrier; remaining questions are not what can be done with technology, but what should be done

In 1985, the Illinois legislature incorporated 20 existing State-funded computer consortiums into 18 Educational Service Centers (ESCs). As part of an effort to aggregate services, ESCs are required to offer technology support to districts, developing budget requests based on local needs and priorities. In 1986-87, $8.5 million was appropriated for 18 ESCs and $8.16 million in 1987-88. A Math/Science Equipment and Materials Loan Program was initiated by the State in 1987 with a one-time $20 million appropriation.

Illinois does not provide direct support for distance learning but local districts may, and do, use State aid. An electronic network between SDE and regional centers is in place; some centers also have a network with local districts.

Training in technology is offered through ESCs. Staff development funds also are available. A software evaluation database is available to each ESC.

Indiana

State position/unit: Yes (1980)
State plan: Yes (1983)
Key actors: Legislators; Governor; Chief State School Officer; Consortium for Computer and High Technology Education
Funds available through the State for technology activities: State technology; Federal
Source of funding in most districts: Capital Improvement Fund[38]
State training policies: Preservice (recommended)
State funding for technology training: Yes
Way most teachers receive training: State
Most important State action: Funding training rather than hardware/software; funding demonstration projects; change in laws to allow purchase of hardware via Capital Improvement Fund; creation of low-interest loan program.
Major changes in past year: None
Barriers: Curriculum

In 1983 legislation created the Consortium for Computers and High Technology Education. The Consor-

[37] Institutions of higher education recommend training/courses in technology.

[38] A separate local tax levy funds buildings, replacements, and renovation. The second primary source of funding for technology at the district level is the School Technology Advancement Account, a State low-interest loan program.

tium developed a plan addressing training, research, and demonstration, but not curriculum. Over $5 million was appropriated for training and demonstration projects for 1985-87 and again for 1987-89. Funds for districts are also available through a Low Interest Loan Program, the State Capital Improvement Fund, and Federal Chapter 1, Chapter 2, and Title II programs.

The first round of State funding focused on teacher training. Initial efforts provided introductory level training (with substitutes) through nine training centers and more advanced training through local funding and colleges/universities. The centers were closed and training is now conducted at school sites by regional consultants. Indiana now funds some local programs and teacher fellowships.

With State funds, nine demonstration projects with a 2:1 ratio of students to computers were implemented in self-contained classrooms in 1985. Eight of the projects received sustaining levels of funding for a second year and competition was opened for additional sites. The next steps include replication,

Iowa

State position/unit: No[39]
State plan: No
Key actors: Intermediate service agencies
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: State grants that may be used for technology
State training policies: None
State funding for technology training: None
Way most teachers receive training: Regional centers
Most important State action: Start-up money for Instructional Software Clearinghouse
Major changes in past year: State program was eliminated and funding cut; responsibility now at local and regional level
Barriers: Completion of statewide electronic network

Legislation in 1987 contained a provision for checking wasteful proliferation of computers and mandated that plans be approved by the State before any local funds could be spent on technology. A State unit was created in 1973 and, with State coordination, 13 regional computer centers were established with local funds. These centers have been phased out and regional education units now provide consultant and support services to schools and districts. In 1987, the State technology unit was also eliminated. General State aid and Federal funds are used at the discretion of local districts.

[39] An educational technology unit in the State Department of Education was created in 1973 and abolished in 1987.

In 1982,$100,000 from the legislature (to be paid back later) provided seed money for a software clearinghouse. Additional funds were appropriated in 1984 and 1985. The start-up money for the clearinghouse, which bought software at reduced rates and sold it to schools, was paid back and the clearinghouse functions were turned over to intermediate units,

With Iowa Public Television, SDE helped coordinate five distance learning projects using local funding and business support. Districts interest in a statewide electronic network that would use existing distance learning systems is under investigation.

Kansas

State position/unit: Yes (1984)
State plan: No
Key actors: Chief State School Officer
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: District
State training policies: Preservice (required); inservice (recommended)
State funding for technology training: None
Way most teachers receive training: District
Most important State action: Creating position in SDE
Major changes in past year: None
Barriers: Funding; perceptions of need

General State aid is available to districts for technology and Title II funds are available for training. Planning and curriculum development assistance is available as requested by the districts.

Kentucky

State position/unit: Yes (1984)
State plan: Being developed
Key actors: Business community; Governor; State Advisory Committee; Chief State School Officer; Chair, State Board of Education
Funds available through the State for technology activities: State technology; State education; Federal
Source of funding in most districts: Parent-Teacher Association funds
State training policies: Preservice (required); inservice (recommended)
State funding for technology training: None
Way most teachers receive training: State through district
Most important State action: Created computer specialist position and similar positions in special education in SDE
Next steps: Additional staffing and creation of State unit for instructional computing in SDE

Major changes in past year: Governor's office worked with private vendor to create more involvement in educational technology; electronic network proposed
Barriers: Lack of funding to equalize districts; lack of funding for ongoing inservice training

In 1986, the legislature passed two grant programs to address educational priorities, particularly the Kentucky Essential Skills curriculum. Some projects receiving grants involve technology. Additional funding for educational technology is local or comes from Federal funds. In 1986-87, a statewide electronic network for administrative uses, the Kentucky Educational Networking System was proposed. The project will place a terminal on each teacher's desk at no cost to the districts.

Kentucky requires teachers to have at least one course in using technology for certification. Most inservice training is conducted by local colleges of education.

The Kentucky Network for Educational Telecommunications, a cooperative effort of the Kentucky Association of School Administrators, SDE, Kentucky Educational Television, and the Kentucky School Boards Association provides networking and information to subscribing educators and administrators.

Project Vision, a videodisc project in basic mathematics in grades K-2, was tested in eight sites and funded primarily through donations and private in-kind support. The program was designed with input from teachers and incorporates the Kentucky Essential Skills curriculum. Through an agreement with the vendor, hardware and software for the project are now available outside of Kentucky.

A task force is investigating potential for ITV and inservice programs. The State will install a satellite dish on every school building by 1988-89.

Louisiana

State position/unit: No
State plan: No
Key actors: Teacher organizations; district superintendents
Funds available through the State for technology activities: None
Source of funding in most districts: Chapter l/Chapter 2
State training policies: Preservice (required)
State funding for technology training: None
Way most teachers receive training: District
Major changes in past year: New Governor and superintendent in March 1988
Barriers: Funding

Federal Chapter 1 and Chapter 2 funds are the main source of funding for technology in Louisiana at the local level. No State funds are provided for technology, and State involvement is limited. SDE offers information and assistance to schools and conducts an annual survey of computer use. A half-unit course in computer literacy is required for high school graduation (a computer science or data processing course may be substituted). Certification requirements for computer literacy and computer science teachers have been established.

Maine

State position/unit: Yes (1979)[40]
State plan: Being developed
Key actors: Legislators; Governor; Chief State School Officer; Maine Computer Consortium; State computer consultant
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: Chapter 2
State training policies: None (being reviewed)
State funding for technology training: None[41]
Way most teachers receive training: District
Most important State action: High school proficiency requirement; creating half-time computer coordinator position; use of Chapter 2 funds for Computer Consortium
Next steps: Survey districts; develop State plan
Major changes in past year: High school proficiency requirement
Barriers: Lack of funds; proof of effectiveness; legislative support; local priorities

As part of a 1984 reform act, high school students in Maine are required to demonstrate proficiency in the use of computers. Local districts define proficiency and must submit a plan for State approval. No State funds are earmarked for technology and no other technology-related initiatives have been proposed at the State level. Maine's Innovative Grants program may award funds to programs with a technology component. Professional development funds are available for training in technology and the SDE staff provide training and assistance to educators, schools, and districts. Funding for the State's educational technology activities and for technology in most districts comes from Chapter 2 money.

New institutional relationships have been developed to facilitate the use of technology in Maine's schools. The Maine Computer Consortium was created in 1983 using Chapter 2 funds. The Consortium, which provides training, software review and preview services, and technical assistance to member districts has continued to receive Chapter 2 funding from the State, but most support comes from member districts. In 1986-87, with a $20,000 State Chapter 2 grant and in-kind gifts from Apple, the

[40] Half-time position.
[41] Staff development funds may be used for technology training.

Consortium created ME-Link, an electronic network. The network is available to any educator in the State with a modem. The Consortium received $5,000 in Chapter 2 funds in 1987-88 to publish descriptions of exemplary programs involving technology in the State's classrooms.

Maryland

State position/unit: Yes (1986)
State plan: Yes (1987)
Key actors: Business community; State Advisory Committee; Chief State School Officer; teacher organizations
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: Chapter 2
State training policies: None
State funding for technology training: Yes
Way most teachers receive training: District
Most important State action: Maryland Educational Technology Network
Major changes in past year: Development of State plan; alternative funding programs; partnerships with business and industry
Barriers: Determination of effectiveness; funding

The Maryland Education Technology Network (METN), a project to provide hardware, software, information, and staff support, is a joint effort of the State, districts, and vendors. The goal of METN is to deliver educational materials equitably to schools statewide. During 1985-86, IBM-networked computer laboratories were pilot tested in five schools and the project was evaluated. SDE assisted with training and coordination. METNs have been implemented in 31 school sites using grants from vendors, local funds, and State/local matching grants.

The Maryland Education Foundation (a private foundation) provided $100,000 for State/local matching grants for hardware in 1986-87. There are plans to expand METN, but no State funding has been allocated. Currently, METN is being upgraded to deliver software electronically and to connect sites with SDE.

The State allocated $59,000 to 24 school districts in 1988-89 for training to help teachers integrate technology into the curriculum.

Massachusetts

State position/unit: Yes (1987)"
State plan: Yes (1987)
Key actors: Legislators; State Advisory Committee; professional teacher organizations
Funds available through the State for technology activities: State technology; Federal
Source of funding in most districts: Varies by district
State training policies: None
State funding for technology training: Yes
Way most teachers receive training: Mixed
Most important State action: 1985 Act establishing the Educational Technology Trust Fund, subject to appropriations
Major changes in past year: Advisory Council has presented a State plan and requested increased funding
Barriers: Technology given a lower priority than some other issues

In 1985, State legislation created an Educational Technology Trust Fund to provide grants to local school districts for programs and model projects integrating technology into the classroom. An Educational Technology Council was established. The State allocated $500,000 for the grants program in 1986-87 and $600,000 in 1987-88. An Educational Technology Capital Improvements Grants program provided $1 million in 1987-88 to help districts purchase equipment. A State plan and a request for increased funding were presented to the Board of Education but no action has been taken.

The Commonwealth Inservice Institute, operated by the Massachusetts Department of Education, provides grants to districts for training teachers and administrators in the use of technology. In 1988, the SDE plans to assist schools in planning, acquiring, and training for the use of technology. Regional centers and a number of other consortia and organizations also provide assistance, support, and software preview services to schools and educators.

Four distance learning pilot projects, each connecting two sites, were funded in 1986-87 and 1987-88.

Michigan

State position/unit: Yes (1986)
State plan: Yes (1987)
Funds available through the State for technology activities: State technology; State education; Federal
Source of funding in most districts: District
State training policies: None
State funding for technology training: Yes
Way most teachers receive training: District
Most important State action: State plan; establishing regional technology centers; suggested curriculum guidelines
Next steps: Broaden scope
Major changes in past year: State plan, 1987
Barriers: Identification of common goals among various groups; coordination of grants

A 1983 educational reform report recommended that technology be integrated into instruction and educational

"In 1987, the Bureau of Educational Resources and Television was changed to the Bureau of Educational Technologies.

management. One-half year of "hands on" computer education was also recommended for high school graduation. As a result, a number of discretionary grants were awarded to schools and districts for technology projects. A State plan for technology, developed over 3 years, was approved in 1987. It calls for the State to provide technical and planning assistance to districts, assist in funding options for hardware and software, act as an information clearinghouse, conduct evaluations, and provide training. Over $1 million for Special Projects Discretionary Grants was appropriated by the State in 1986-87 and 1987-88. Funds for two-way interactive television and computer literacy/educational technology also were provided in 1987-88. Federal Chapter 1, Chapter 2, and Title II funds for technology are distributed on a joint basis.

Three regional centers provided software preview, information, and technology support services to districts. These services are now offered through the regional education service centers. An additional center for technology training was funded in 1987-88.

Minnesota

State position/unit: Yes (1979)
State plan: Yes (1985)[43]
Key actors: Business community; legislators; Governor; Chief State School Officer
Funds available through the State for technology activities: State technology; State education; Federal
Source of funding in most districts: State grants that may be used for technology and district funds
State training policies: Preservice (recommended)[44]
State funding for technology training: Yes
Way most teachers receive training: State/District
Most important State action: Training; planning; focus on learning rather than technology
Major changes in past year: Distance learning use by rural districts
Barriers: Questions about cost-effectiveness relative to other improvement strategies

State educational technology efforts began in the 1970s with the creation of the Minnesota Educational Computing Consortium (MECC) to provide computer services to schools through a time-sharing system, train teachers, conduct evaluations, and develop software. The 1983 legislation extended State efforts through funding to districts for technology planning, training, and software purchase. Technology demonstration sites were also supported and State funds were appropriated to MECC for software development. Over time, MECC has supported its activities by selling software outside of Minnesota and is now a separate nonprofit corporation.

At present, Minnesota's strategy is to make the use of technology "invisible"--less separate from other educational initiatives and objectives—by encouraging the use of application software in subject areas. Minnesota has also supported distance learning to teach elective courses. Funding for model technology projects decreased from $5.3 million in 1983-85 and 1985-87 to $2.8 million in 1987-89. Instead, innovative projects involving technology are supported under State funds for instructional design. State funds for technology are available through general State aid and Federal dollars are used at local discretion. Sixty percent of all educational funding is provided by the State. Minnesota has continued to fund technology training at about $865,000 per year. An $8 million professional development program provides opportunities for teachers to learn how to use technology in instruction.

Mississippi

State position/unit: No
State plan: Being developed
Key actors: Chief State School Officer; local district administrators
Funds available through the State for technology activities: Federal
Source of funding in most districts: District
State training policies: None
State funding for technology training: None
Way most teachers receive training: District
Most important State action: Pilot project assessing use of distance delivery using TI-IN
Major changes in past year: A State plan will be developed
Barriers: Funding; training

State activities and funding for educational technology in Mississippi are limited and the SDE staff person responsible for technology has left and has not been replaced. The State evaluates administrative software and participates in SEED. Title II funds are being used for a distance learning pilot project in a rural school. The State superintendent has appointed a chairman and committee to begin work on a State plan for technology in the schools.

Missouri

State position/unit: No
State plan: No
Key actors: Business community; teacher organizations
Funds available through the State for technology activities: State education; Federal

[43] Minnesota's 1987 plan, Information Technology Learner Outcomes, focuses on enhancing learning using educational technology and lays out broad educational goals with suggested instructional approaches.

[44] Minnesota requires media teacher to demonstrate familiarity using technology instruction at the preservice level and recommends that all preservice and inservice teachers take a computer-related course and/or show familiarity using technology in instruction.

Source of funding in most districts: Chapter 2
State training policies: None
State funding for technology training: Yes
Way most teachers receive training: District
Most important State action: Onetime allocation of $3 million in 1985-86
Next steps: Dissemination of information unsuccessful projects followed by incentives to adopt
Major changes in past year: None
Barriers: Diversity; funding; lack of training/commitment by school staffs

During 1985-86, $2.5 million was provided by the Missouri legislature for hardware, software, and staff training. Most went to school **districts on a formula basis and** the rest was used for training provided by temporary State consultants.

No State funds have been appropriated specifically for technology since; however, $4 million for innovative and exemplary programs was provided in 1986-87. These funds may be used for training. In addition, State textbook funds may be used for software. Federal Chapter 1, Chapter 2, and Title II funds may be used by districts for technology at local discretion.

In 1987, the Missouri School Boards Association established the Educational Satellite Network (ESN) to provide interactive instructional programming, inservice education, and other programs. ESN owns and maintains all satellite receiving systems and schools pay for installation, local maintenance, and program guides. The State will approve curriculum and programs on the system and the President of the State Board of Education will serve on the ESN Board of Directors.

Montana

State position/unit: Yes (1981)
State plan: No
Key actors: Chief State School Officer; teacher organizations; parents
Funds available through the State for technology activities: Federal
Source of funding in most districts: Chapter 2
State training policies: Preservice (required); inservice (recommended)
State funding for technology training: None
Way most teachers receive training: District
Most important State action: Active support of SDE in assisting schools and educators
Major changes in past year: All State funding is frozen and local levies cannot pick up slack due to voted initiative
Barriers: Funding; training; resistance to change

There are no legislative mandates or State funds for technology in Montana. The Board of Public Education recommends that all students become computer literate and SDE provides training and assistance to schools and districts. Curriculum decisions are made locally and districts decide how to spend State general aid and Federal funds. Teachers are required to have familiarity using technology in instruction at the preservice level. The Board of Education has begun to study accreditation standards for schools, and technology is a major concern for all subject areas.

A National Science Foundation and Title 11 funded program, Project IMPACT (Integrating Mathematics Programs and Computer Technology) is operated through the Montana Council of Teachers of Mathematics, the University of Montana, Montana State University, and the Montana Office of Public Instruction. Mathematics teachers in grades 7 to 12 will receive training to integrate technology into instruction during 1988-89.

Nebraska

State position/unit: Yes (1985)
State plan: Yes (1986)
Key actors: Chief State School Officer; Educational Telecommunications Commission
Funds available through the State for technology activities: None
Source of funding in most districts: District
State training policies: None
State funding for technology training: None
Way most teachers receive training: Mixed
Most important State action: None
Next steps: Do a realistic long-term plan
Major changes in past year: None
Barriers: Funding; politics; vision/understanding

Legislation in 1984 created the Educational Technology Consortium which developed a set of recommendations for instructional technology in Nebraska. No funding was appropriated for implementation, however, and activity varies depending on local priorities. The State provides technical assistance and training on a limited basis.

Nevada

State position/unit: Yes (1985)
State plan: Yes (elementary 1986; secondary 1988)
Key actors: District computer coordinators
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: District
State training policies: Preservice/inservice (recommended)
State funding for technology training: None
Way most teachers receive training: For-credit course paid for by teacher

Most important State action: State funding for technology appropriated in 1985
Major changes in past year: None
Barriers: Continued State funding

In 1985, the legislature appropriated $10 million on a one-time basis for educational technology; $7 million was used for K-1 2 program improvement and $3 million was earmarked for vocational/occupational education. Additional discretionary funds were provided in 1985-86 and 1986-87 for overall program improvement but were not designated for technology. These State funds and Federal Chapter 1 and Chapter 2 funds are used at local discretion. Some Chapter 2 grants awarded by the State include a technology component. An elementary course of study was adopted which includes computer literacy and use. A secondary course of study with a computer component is being developed.

The State funded a distance learning pilot project within one district for 2 years. The project is now funded locally. There is concern that distance learning efforts are duplicated and a new task force will develop recommendations regarding educational telecommunications for the 1989 legislative session.

The State technology consultant provides assistance and training by request. Training grants are provided with Title II funds,

New Hampshire

State position/unit: No
State plan: Yes (1986)
Key actors: Business community; legislators; Governor; State Advisory Committee; Chief State School Officer
Funds available through the State for technology activities: State technology; Federal
Source of funding in most districts: State grants for technology
State training policies: None
State funding for technology training: Yes
Way most teachers receive training: District
Most important State action: Providing 1,950 teachers with computers for 3 years; interactive videodisc pilot project
Major changes in past year: Continued and increased funding for initiatives in place
Barriers: Changes in economy that may restrict spending

Under a 1985 Governor's Initiative Program, $5 million was awarded for education of the gifted and talented, computers for teachers, and technology in the classroom. An additional $2.5 million was appropriated for educational technology in 1987. With these funds, 1,950 teachers were provided with a computer for 3 years and offered training and networking assistance. In addition, grants were awarded to six teachers to develop model instructional lessons using videodisc. Empirical data was collected, but it is too early to assess effects on student outcomes. Other State grants are available for videodisc hardware, training, model projects, and distance learning. All grants require a training component. Federal Chapter 2 and Title 11 funds maybe used for technology-related activities at local discretion.

New Jersey

State position/unit: Yes (1983)
State plan: Yes (1986)
Key actors: Governor; State Advisory Committee; Chief State School Officer
Funds available through the State for technology activities: State technology; State education; Federal
Source of funding in most districts: District
State training policies: None
State funding for technology training: Yes
Way most teachers receive training: State
Most important State action: Creation of State technology unit; funding training centers; school improvement project for urban districts; implementing State plan; developing educational technology network
Next steps: Product development; training on integration of technology into classrooms
Major changes in past year: On a plateau now with no significant changes in sight
Barriers: Training; quantity of hardware still low in many districts

A State plan for educational technology was issued by SDE in 1986. Three regional training centers were established and provide free, ongoing services to educators. Each center consists of a training laboratory and a software/hardware library. A statewide telecommunications system, the Educational Technology Network, was created and provides free access to districts that have the right equipment. Technology is included as part of a comprehensive effort to improve educational services in three urban districts, called Operation School Renewal (OSR). Over $1 million supported these three programs in 1986-87 and $278,000 was provided in 1987-88. Funds for technology are also available through general State aid, Federal special education funding, and a portion of Chapter 1 funds.

A pilot project to transmit software electronically was implemented in Trenton in 1987 using OSR funds and vendor contributions. Other districts are expected to have similar capabilities soon. Three other pilot projects are looking at any changes in mathematics and writing skills of eighth grade students due to computer use and evaluating teachers' uses of computers. The technology component of OSR also is being evaluated and reports

are pending. SDE has developed and used interactive videodisc technology and ITV for teacher support and training.

New Mexico

State position/unit: Yes (1980)[45]
State plan: No
Key actors: State Advisory Committee
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: State capital outlay funds
State training policies: None
State funding for technology training: None
Way most teachers receive training: District; for-credit course; teacher to teacher
Major changes in past year: State Board of Education approved guide for computer literacy in grades 1-8
Barriers: Training; research on effects of technology in instruction and how best to implement what exists in schools

In 1986, legislation mandated the inclusion of computer literacy and computer use in the instructional program for grades four through six, a computer literacy elective in grades seven through eight, and an elective course in computer science at the high school level. During 1985-86, over $1 million was appropriated to help schools purchase hardware and software. The funds were distributed on a competitive basis. Approximately half of the districts received funds; most received only partial funding for projects. The State has not provided additional funding for educational technology. Districts typically use State capital outlay funds for hardware and Federal funding is used for technology at local discretion. School districts provide for their own training needs.

New York

State position/unit: Yes (1982)
State plan: Yes (1985)[46]
Key actors: Legislators; Chief State School Officer; **teacher organizations**
Funds available through the State for technology activities: State technology; State education; Federal
Source of funding **in most districts:** State funds for technology received by all districts
State training policies: None
State funding for technology training: Yes
Most important State action: Creating technology unit in SDE; plan approved by Regents
Next steps: Remove regulatory and funding barriers; study potential policy barriers
Major changes in past year: A reconsideration of policy issues
Barriers: Regulations and funding mechanisms that make it difficult to use technology for instruction across institutional boundaries

The 1983 "Regents Action Plan to Improve Elementary and Secondary Education" required curriculum revisions and the integration of technology into all content areas, and initiated a range of State efforts to support the use of technology in education. The Center for Learning Technologies developed a plan of action in 1985 that included research and development (R&D), professional development, instructional materials, telecommunications, and technological integration. State funds support hardware and software purchase, the Technology Network Program (to link schools electronically), and 91 Teacher Resource and Computer Training Centers. About $36 million funded technology initiatives in 1986-87 and $41.2 million in 1987-88. In addition, the State provides partial funding for cooperative projects, many of which are technology related. Federal funds are used by districts and within the guidelines of specific programs, but specific figures are not available.

A Technology Planning Program for local districts was developed by the Center for Learning Technologies; replication is planned if the project is funded again. Training for educators is available through the Teacher Resource and Computer Centers.

Several projects targeted to specific populations, including the use of distance learning for rural schools, are also supported by the State. A proposal to study New York's educational policies is under consideration.

North Carolina

State position/unit: Yes (1984)
State plan: Yes (1983)[47]
Key actors: Legislators; State Advisory Committee; Chief State School Officer; district computer coordinators
Funds available through the State for technology activities: State technology; Federal
Source of funding in most districts: State technology funds received by all districts
State training policies: Preservice/inservice (recommended)
State funding for technology training: Yes
Way most teachers receive training: District
Most important State action: State plan; guidelines; funding for statewide computer education program

[45] A Computers in Education Committee has been established in the State Department of Education but, its influence on State action has been minimal.
[46] New York's plan for educational technology is strategic, not operational. Some legislation proposed in the plan has been passed.
[47] North Carolina's State plan addresses the use of computers in schools

Next steps: Implementation of distance learning by satellite in all districts and 54 small schools
Major changes in past year: Computer legislation and funding completed; slowdown in growth and training expected; increased activity in telecommunications
Barriers: Time and funds for local school systems to implement State initiatives and directives

A State plan for computers in education was approved in 1983 and $28.5 million was appropriated for hardware, software, maintenance, and staff development over a 3-Year period (1984-87). The goal of State action was to provide at least 1 computer for every 50 students for at least 30 minutes of hands-on use per week. Districts were required to submit a plan for funds. In addition, Title 11 funds are used for innovative technology projects and to support the use of technology by underserved students. During 1986, SDE issued computer competencies for all students in K-12 and made recommendations on media center automation and computer facilities.

In 1986-87 a distance learning by satellite pilot project was undertaken using a Federal Title 11 grant. Following a positive evaluation, $3 million in State funds was allocated in 1987-88 to implement distance learning by satellite in 54 small, mostly rural high schools.

Three levels of technology competencies for educators have been defined by the State. A new title and increase in salary is awarded to teachers who reach an advanced level of training in technolog, and wish to take on a supervisory role. During 1985-87,$2 million was allocated to school districts on a per certified position basis for technology training. The State also appropriates $100 per teacher for staff development each year.

North Carolina participates in SEED.

North Dakota

State position/unit: No
State plan: Being developed
Key actors: Legislators; Governor; State Advisory Committee; Chief State School Officer
Funds available through the State for technology activities: State technology (1987-88); Federal
Source of funding **in most districts:** District
State training policies: None
State funding for technology training: None
Way most teachers receive training: For-credit course paid for by teacher
Most important State action: Appropriating funds for 1987-89
Next steps: Complete State plan; expand funding and implement plan
Major changes in past year: Reduced enrollment and financial resources and lack of upper level courses in certain areas may encourage greater use of technology, especially in rural schools
Barriers: Funding; attitude of administration; lack of training

Two pieces of legislation in 1987 provided funds for educational technology. No State funds were appropriated prior to this action. For 1987-89, a $500,000 appropriation enabled local school districts to purchase equipment and programming. The State allocated $100,000 to develop software on North Dakota history and geography with Broderbund Software and $50,000 for a foreign language distance learning program. Districts may use Chapter 2 funds for hardware. The State has provided funding to a public television station which provides some training in the use of instructional technology, primarily ITV. A State plan for technology is being developed.

Ohio

State position/unit: Yes (1984)
State plan: Being developed
Key actors: State Advisory Committee; Chief State School Officer; teacher organizations; other professional organizations
Funds available through the State for technology activities: State technology; State education; Federal
Source of funding in most districts: Chapter 2
State training policies: Preservice (required); inservice (recommended)
State funding for technology training: Yes
Way most teachers receive training: Regional centers
Most important State action: Educational Technology Center; curriculum and planning publications; Classroom of the Future project; annual statewide computer fair; ITV network which provides services through regional centers
Major changes in past year: Classroom of the Future projects expected to have a positive effect on State efforts
Barriers: Funding; unequal funding at local level; questions about extent of State role

The Educational Technology Center was established in 1984 to disseminate information, provide hardware and software preview, and offer technical assistance. Since 1979, the State has also supported the Ohio Education Computer Network, an effort to link all school districts for administrative purposes. SDE encourages the use of technology to promote learning skills and has developed guidelines in the area of industrial arts/technology education at the junior high and high school level, Approximately $4 million in Chapter 2 funds were used for instructional technology at the local level in 1986-87 and it is expected that a similar amount will be used in 1987-88.

In 1987-88, $200,000 was allocated to one school district to begin development of a curriculum that includes

the use of technology. The district, which is working with local communit, colleges and businesses, has focused on training first and is seeking additional funds to continue. Ohio also has provided some fundin, (mostly Federal discretionary funds) for the Classroom of the Future, an effort to develop a model curriculum which includes technology and provides demonstration sites throughout the State. Recommendations will be produced in the summer of 1988 and additional State funds probably will be requested to implement demonstration projects,

Ohio requires preservice familiarity with the use of computers in instruction for certification. Inservice training is primaril, the responsibilit, of districts and the ITV network. State funds for inservice training are available through a professional development program and categorical funds from lottery proceeds may be used for technology training. Federal funds are available through Title II and Chapter 2. The State has allocated $150,000 for planning for a Teacher Technolog, Center.

Oklahoma

State position/unit: Yes
State plan: No
Key actors: Business community; legislators; Chief State School Officer
Funds available through the State for technolog, activities: State technology; Federal
Source of funding in most districts: State grants for technolog, to a limited number of schools or districts
State training policies: Preservice (required)[48]
State funding for technology training: None
Most important State action: Satellite instruction regulations; establishing certificate of endorsement in computer science; State grants for technolog,
Next steps: Develop State plan
Major changes in past year: Decreased funding for education due to crises in oil and agriculture industries
Barriers: Funding; awareness, understanding, and support of decisionmakers

Since 1983, Oklahoma has funded a competitive technology grant program for school districts for equipment, software, and for administrative support for instructional programs. The State appropriated $1,5 million in 1986-87 and $1.9 million in 1987-88, Additionally, $50,000 was granted to Stillwater Public Schools for a PLATO-WICAT Computer Program in 1986-87. Computer science is a recommended elective for students preparing for admission to Oklahoma colleges and universities and schools are encouraged to use technology in ways to help meet the needs of students and faculty. A curriculum guide and recommendations for keyboarding have been developed.

The State supports a variety of distance learning and rural education activities: $330,000 for competitive Rural Technology Education Grants for Satellite Instruction in 1986-87 and again in 1987-88; $185,000 for Telecommunications in Education Grants; and a $212,000 grant to Oklahoma State Universit, for satellite instruction course development in 1987-88, including a German-by-Satellite course. In 1987, the State Board of Education adopted regulations governing satellite instruction.

Computer-related courses at the preservice level are required for some teachers. The State provides no funding for training but offers workshops on site and through the SDE Computer Laboratory. SDE also maintains a software preview library and provides information and technical assistance to educators.

Oregon

State position/unit: Yes (1960s)
State plan: No
Key actors: Business community; Chief State School Officer
Funds available through the State for technolog, activities: State technology (1986-87); State education; Federal
Source of funding in most districts: Chapter 2
State training policies: None
State funding for technology training: Yes[49]
Way most teachers receive training: District
Most important State action: Providing curriculum materials for video (for over 20 years) and for computers (over 5 years)
Major changes in past year: Large decrease in State support for technology instructional materials
Barriers: State technology funding has been reduced each year since 1978

Oregon has supported instructional video since the 1960s. In the early 1980s, State and Federal funds helped to establish the Oregon Educational Computer Consortium (OECC). With dues from districts, OECC hired a staff person within SDE. In 1985-86, $25,000 in State funds was provided to support the Consortium. In 1986-87, $23,500 was provided to assist in a contract for software. No State funds were provided in 1987-88. General State aid and Federal fundin, may be used for technology at local discretion. A State plan was drafted but was not implemented.

Training, software preview, and technical assistance are provided to districts through OECC. The State also sup-

[48] Preservice coursework in computer literacy is required in Oklahoma for early childhood and elementary certification. At the secondarv level, computer-related courses are required for teachers of business, mathematics, computer science, and for media/l[brarv specialist certification.

[49] Oregon provides funding for technology training Indirectly through support for Oregon Public Broadcasting and the Oregon Educational Computer Consortium. Both provide teacher development activities.

ports Oregon Public Broadcasting which provides some staff development to teachers. Training is coordinated at the district level.

Pennsylvania

State position/unit: No
State plan: No[50]
Key actors: Legislators; Governor; State Advisory Committee; Chief State School Officer
Funds available through the State for technology activities: State technology; State education; Federal
Source of funding in most districts: Chapter 2
State training policies: Preservice (required); inservice (recommended informally)
State funding for technology training: Yes
Way most teachers receive training: District
Most important State action: Focusing Chapter 2 funds on technology; providing funding for training through regional centers and grants to schools; creating an electronic network; establishing a program to provide for joint purchase of computers by schools
Next steps: Establishing computer science certification
Major changes in past year: State funding requested for the Pennsylvania Higher Education Assistance Agency, a public corporation, and for the Science Teacher Education Program
Barriers: Diversity of districts; keeping up with changing technology

State Chapter 2 allocations have been used for competitive grants for technology and for inservice training, including PENN* LINK, an electronic network that is planned to link all schools and LIN-TEL, a statewide electronic network for libraries. Districts also use Chapter 2 funds for technology: in 1986-87, 29 percent of local Chapter 2 funds were used for computer hardware. Federal vocational education, special education, and Title 11 funds are also used for educational technology by the State and districts. In response to unequal distribution of computers, the State targeted Chapter 2 funds to rural districts in 1987-88.

Technology training and support services are provided by 15 Regional Computer Resource Centers (RCRC). The RCRCs are located at colleges, universities, and intermediate units and are administered by the Pennsylvania Higher Education Assistance Agency (PHEAA), a public corporation which receives State funding. PHEAA also administers technology grants to schools and districts, in addition to the grants awarded at the State level. Over $5 million was provided by the State in 1986-87 and again in 1987-88 for the educational technology programs administered by PHEAA and for other State initiatives, including a program which provides for joint purchasing of computers by schools. In 1986, the legislature approved a line item in the State budget for a videodisc database of school library holdings. In addition, $27 million in State funds were distributed to districts for 1984-87 to update vocational/technical programs in the State.

The use of computers to support the learning process is encouraged through the State's "Goals of Quality Education," New regulations require that computer science be offered to all secondary students. Teacher certification in computer science is being considered.

Rhode Island

State position/unit: No
State plan: No
Funds available through the State for technology activities: State education
Source of funding in most districts: District; Chapter 1; Title 11
State training policies: None
State funding for technology training: None[51]
Way most teachers receive training: Unknown
Major changes in past year: Planning initiative and considering creating technology centers
Barriers: No State level staff person

A half-unit computer literacy requirement for high school students was established in 1983. Over a 3-year period (1983-86), $4 million was appropriated for educational technology: $1 million was allocated for vocational facilities and $3 million for elementary and secondary schools. Districts are required to repay 40 percent of the funds over a 5-year period. The State completed a $300,000 inservice education program in 1986 which provided training for 5,000-6,000 of the State's 8,000 teachers. Teachers now may receive inservice training in technology under the Rhode Island School Staff Institute. A State initiative in educational technology is in the planning stages,

South Carolina

State position/unit: Yes (1983)[52]
State plan: No
Key actors: Legislators; Chief State School Officer
Funds available through the State for technology activities: State technology
Source of funding in most districts: State grants for technology

[50] There is no State plan for educational technology in Pennsylvania, a model technology utilization plan is being developed for special education and the State has a 3-year plan to link all schools in the State electronically.

[51] Professional development funds may be used for technology training.

[52] In 1983 an existing Office of Instructional Television was renamed the Office of Instructional Technology. South Carolina is revolved in a number of activities relating to instructional television.

State training policies: Preservice (required for business education)
State funding for technology training: Yes
Way most teachers receive training: For-credit course paid for by teacher
Most important State action: Pathways Project to reduce teacher paperwork; creation of State instructional technology unit; participation in curriculum mapping project through SEED[53]
Major changes in past year: None
Barriers: Need for more hardware and software; insufficient opportunity to preview software; training; questions about relating technology to the curriculum and teaching

Legislation enacted in 1984 established the Pathways Project, an effort to reduce teacher paperwork and create an electronic network for administrative uses. The project received $5.4 million in 1986-87. Approximately $300,000 was provided to districts for computer education courses over the past 3 years. Funds are allocated to provide at least one course per district and training is primarily a district responsibility. Inservice computer courses can be applied to renewal of certification in all fields.

The State publishes a recommended list of software for basic skills instruction in language arts, mathematics, and science, and operates six basic skills software regional laboratories. Staff development programs are broadcast over the South Carolina Educational Television Network. South Carolina participates in SEED.

South Dakota

State position/unit: Yes (1982)[54]
State plan: No
Key actors: State Advisory Committee; Chief State School Officer; local districts
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: District; Chapter 2
State training policies: Preservice/inservice (informally recommended)
State funding for technology training: None
Way most teachers receive training: Mixed
Most important State action: Creating technology position in SDE; creating statewide consortium
Next steps: Establish a permanent funding base for the technology consortium
Major changes in past year: None; hope that distance learning projects will generate more interest
Barriers: Funding; local leadership; training

A State position for educational technology was created in 1982 and a 5-year plan (1982-86) was developed. In 1985, a statewide educational technology consortium (TIE) was established with State support. TIE is funded by districts, which may use general State aid and Federal funds for membership or other technology-related activities.

South Dakota requires a half credit of computer studies, a hands-on course, for high school graduation. The development of computer-related skills (keyboarding, CAI, integrated tool software, and programming) is encouraged at all grade levels.

Three schools were selected by the State for distance learning pilot sites using the TI-IN Network in 1986.

Tennessee

State **position/unit: Yes (1984)**
State plan: Yes (1984)
Key actors: Legislators; Governor; State Advisory Committee
Funds available through the State for technology activities: Federal
Source of finding in most districts: Chapter 2
State training policies: Preservice (required)
State funding for technology training: None
Way most teachers receive training: State
Most important State action: Implementation of Comprehensive Education Reform Act
Major changes in past year: None
Barriers: Availability of additional funding

A mandate requiring computer literacy instruction for all seventh and eighth grade students was approved in 1983 and one-time funding of $9 million was provided to districts for hardware. Under the mandate, all students receive 15 computer literacy lessons in the seventh and eighth grade. Each instructor received an initial 5 days of training. Suggested curriculum guides have been developed to encourage the use of technology throughout the K-6 curriculum and to encourage computer science at the secondary level.

No State funds currently are available for educational technology. The State set aside $25,000 in Chapter 2 funds for a technology conference (1986-88) and $10,000 in Title 11 funds for technology in education. Tennessee continues to train teachers for the required computer literacy instruction and provides inservice training and technical assistance to other educators.

Texas

State position/unit: Yes (1983)
State plan: Being developed

[53] The SEED curriculum mapping project is in the planning stages. For more information, contact the Southeastern Educational Improvement Laboratory,.

[54] A State-level educational technology position was created in 1982 in South Dakota. In 1985, responsibility for implementation and support was transferred to a statewide educational technology consortium (TIE). An assistant State superintendent maintains administrative responsibility for educational technology

Key actors: Legislators; State Advisory Committee; Chief State School Officer; professional associations
Funds available through the State for technology activities: State technology; Federal
Source of funding inmost districts: District
State training policies: Preservice (required); inservice (recommended)
State funding for technology training: None[55]
Way most teachers receive training: District
Most important State action: Computer literacy requirement for seventh or eighth grade and computer course requirement for advanced high school diploma; distance learning courses; electronic network
Next steps: Elementary computing guidelines; State plan; further implementation of distance learning and electronic network; further research and demonstration
Major changes in past year: State plan being developed
Barriers: No State plan; training; funding (for R&D, training, and equipment)

Legislation in 1981 requires that all students in Texas take at least one semester in computer literacy in seventh or eighth grade (beginning in 1985-86). The required course specifies applications, awareness, and programming. All districts are required to teach computer competencies, including keyboarding, in the elementary schools beginning in 1987. Guidelines are being developed. Texas also awards an advanced high school diploma which includes courses in computing.

The State has not funded local implementation efforts, but has funded several pilot projects with State and Federal dollars. In 1986-87 the State provided on-line expenses to 14 school districts to study their use of electronic communications. Minimal on-line expenses and money for software were provided to two model districts to study the potential of a statewide electronic network. In addition, Chapter 2 discretionary funds were used for 10 pilot districts to study the use of technology for basic skills instruction in 1986-87 and for 8 more projects in 1987-88.

Preservice teachers are required to take a computer course or demonstrate proficiency using computers in instruction. The State's long-term strategy for both preservice and inservice involves moving training for technology into universities and regional centers. Currently, the State technology unit initiates training efforts, provides technical and curriculum assistance, and is involved in long-range planning.

Utah

State position/unit: Yes (1985)
State plan: Being developed
Key actors: Business; legislators; Governor; State Advisory Committee; Chief State School Officer; parents; State staff
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: State grants that may be used for technology
State training policies: Preservice/inservice (required)
State funding for technology training: None (pending study)
Way most teachers receive training: District
Most important State Action: Educational Technology Study conducted in conjunction with IBM
Major changes in past year: Positive–completion and implementation of study
Barriers: Funding

Core curriculum standards for information technology are in place in Utah for grades K-12. These standards may be taught either by "infusing" them into other areas of the curriculum or in a specific course. An "Application Transfer Study," conducted in conjunction with IBM, was completed in 1987. The study assessed the current status of educational technology in Utah and made recommendations for future directions. No State funding is provided specifically for educational technology, but a recommendation is pending for the 1988 legislative session. State productivity grants have been used for technology by local districts. Federal funds are used to support the Information Technology Demonstration Center which serves as a clearinghouse for State efforts. The center also works with regional education service centers.

Teachers at the preservice and inservice level are required to take technology courses or demonstrate familiarity using technology in instruction. No State funds are provided for technology training, but a recommendation is under consideration.

In 1985, the development of a distance learning accelerated pilot project to teach Spanish was funded by the State with support from IBM and Bonneville International Corp., a private satellite company. The course is now available to schools in other States.

Vermont

State position/unit: Yes (1987)
State plan: Being developed
Key actors: Legislators; Chief State School Officer; teachers; parents; superintendents
Funds available through the State for technology activities: Federal
Source of funding in most districts: District
State training policies: None[56]

[55] The State provides additional funds to school districts to use in placing teachers on a career ladder. Technology workshops and courses may be applied toward credit *for the* career ladder.

[56] A pending State plan will recommend that all teachers demonstrate competency in using technology in instruction by 1990.

State funding for technology training: None
Way most teachers receive training: For-credit course paid for by teacher
Most important State action: Flexibility at local level
Major changes in past year: Creation opposition in SDE
Barriers: Funding

Vermont provides no funding for educational technology and only limited technical assistance and support. Federal funds are used for technology if proposals from districts include technology. Suggested curriculum guidelines have been developed and the State uses the term "technology capable" to encourage teachers and students to use technology as tools.

A technology staff position was established in 1987 and a State plan is being developed by SDE. The plan will encourage the implementation of a range of technologies in the early grades.

Virginia

State position/unit: Yes (1987)[57]
State plan: Being developed
Key actors: Business community; legislators; Governor; State Board of Education
Funds available through the State for technology activities: State technology; Federal
Source of funding in most districts: Unknown
State training policies: Inservice (recommended)
State funding for technology training: None
Way most teachers receive training: District
Most important State action: Governor's Commission issued Plan *for Action*
Next steps: Get legislative support; develop 5-year plan; implement plan
Major changes in past year: Potential legislation; development of plan; interest of Governor and some legislators
Barriers: Cost and rapid obsolescence of equipment; awareness of value among top educators; mobilize teachers to use technology over the long-term; stable funding commitment

All Virginia high school graduates must demonstrate computer competency. The State provides a training laboratory, information, and technical assistance to educators. An "electronic classroom, " offering advanced courses and Latin instruction to some schools through the public broadcasting network in Virginia, was established in 1985 to address educational disparities across the State. A second electronic classroom was implemented in 1987 and half of Virginia schools have been involved. State costs for the electronic classrooms were $275,000 in 1986-87 and $600,000 in 1987-88. The State hopes to implement additional sites and plans to transmit courses using a combination of public television and satellite technology. No additional State funds are currently provided for educational technology. Federal funds may be awarded through grants for technology-related projects. Over $65,000 in Federal funds was approved for technology-based projects in 1987-88.

The Governor's Commission on Excellence in Education has issued a plan that includes a section about the use of technology. An Assistant Superintendent for Instructional Technology was created in 1987 and a State plan for educational technology is being developed. Over $20 million has been requested in the legislature for electronic classrooms, an electronic network, and computer purchases to address disparities in distribution of technology across the State. Training is included in the request. This is the first time a budget of this type has been proposed in Virginia.

A 2-year demonstration project, funded by the Potomac Edison Co., in cooperation with SDE in 1987, has 10 networked classrooms for mathematics and science. Proposals for evaluation are being developed.[58]

Washington

State position/unit: Yes (1983)
State plan: Being developed
Key actors: Business community; legislators; Chief State School Officer; teacher organizations
Funds available through the State for technology activities: State technology; Federal
Source of funding in most districts: District
State training policies: Preservice (required)
State funding for technology training: Yes
Way most teachers receive training: Regional centers
Most important State action: Established Educational Technology Center Program and provided continued funding
Next steps: Collaboration between education, business, and industry
Major changes in past year: Telecommunications legislation passed in 1987; anticipated to have major impact
Barriers: Funding; release time for training; lack of coordination of resources between districts; lack of high-quality software; difficulty matching software with student learning objectives

A network of Educational Technology Centers was established through legislation in 1983. The centers provide inservice classes and workshops, technical assistance, software/hardware preview, and curriculum development

[57] A Department of Media and Technology has offered services to Virginia schools for several years under different departments within the State Department of Education. In August 1987, an Assistant Superintendent for Instructional Technology was hired, moving the department to division status.

[58] Potomac Edison is also supporting projects in West Virginia and Maryland.

assistance. The program is administered through the Superintendent of Public Instruction and currently has an operating budget of $2.3 million per year. Staff development grants are also available on a competitive basis to school districts. No other State or Federal funds are currently earmarked for technology. State grants for school improvement and research were used for some technology-related projects from 1985-87, but this program was not refunded. Federal Chapter 1 and Chapter 2 may be used for technology by local districts.

Preservice teachers are required to have familiarity with technology use in instruction, and high schools are required to offer computer-related courses. The State does not evaluate software, but has developed suggested curriculum guidelines to help educators match software to defined student outcomes.

An act passed in 1987 required SDE and the Higher Education Coordinating Board to develop a plan for a statewide telecommunications network. The plan will be submitted by the 1989 session. A separate proposal was submitted to the legislature which requested over $2 million for a number of initiatives, including technology project development, more staff for the Educational Technology Centers, grants for demonstration sites, and dissemination of information. The proposal was initiated through a cooperative effort between educators; business and industry, and the State superintendent.

West Virginia

State position/unit: Yes (1984)
State plan: No
Key actors: Business community; legislators; State Advisory Committee; SDE
Funds available through the State for technology activities: State technology;[59] State education; Federal
Source of funding in most districts: State grants that may be used for technology
State training policies: Preservice (required for certain areas); inservice (recommended)
State funding for technology training: None[60]
Way most teachers receive training: State
Most important State action: Providing some direction and funding
Next steps: Implement more laboratories and evaluate the use and place of technology within the curriculum; support development and use of instructional management software
Major changes in past year: Two studies being conducted by commissions on finance and education which may lead to more funding
Barriers: Funding; training; time to implement

Following a plan formulated in 1982-83, a statewide electronic network was installed in local school districts in 1984. The project was supported by the State with assistance from the Appalachian Regional Commission and the Federal Job Training Partnership Act. Computer laboratories were first implemented in high schools and are now being put into junior high schools. Training is provided at schools, through summer institutes, and occasionally via the electronic network. Originally intended for administrative and teacher use, the laboratories are now also used for instruction. In 1986-87, $200,000 was provided for laboratories and to cover the operational costs for toll-free access to the network by schools. Funding for 1987-88 is uncertain due to State budget cuts. School districts may also use grants for professional development, general State aid, and Federal funds for technology-related activities.

The State is evaluating distance learning projects to assess costs and educational outcomes.

Statewide learning outcomes for specific curriculum areas have been developed. Proficiency using technology to solve problems and enhance job skills is included in the learning outcomes for vocational education (word processing, spreadsheets, database management, and telecommunications). A 6-week pilot project supported jointly by the State, the U.S. Department of Labor, and IBM used computers and hands-on activities to provide practice in basic skills, career exploration, and improve students' attitudes toward school.

Wisconsin

State position/unit: Yes (1983)
State plan: Yes (1987)
Key actors: Legislators; State Advisory Committee; Chief State School Officer
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: District
State Training Policies: Preservice (required); inservice (recommended)
State funding for technology training: None
Way most teachers receive training: Regional centers
Most important State action: Establishing State educational standards; publishing series of curriculum guides
Next steps: Assist districts in planning and implementation; continued staff development
Major changes in past year: New standards have increased interest in using technology for instruction
Barriers: Reluctance to change and "fear" of technology; funding; local priorities and understanding

Reform legislation passed in 1986 resulted in State standards for curriculum and professional development.

[59] State funding for technology is pending for 1987-88.
[60] "Professional development funds may be used for technology training.

A series of curriculum guides were published requiring changes in both the content and delivery of instruction. Technology is seen as an important component of school improvement and the State encourages local districts to integrate technology into the new curriculum. Local school boards are required to develop curriculum plans that specify objectives, course content, resources, and assessment. No State funds are provided specifically for technology or technology training. However, Wisconsin provides half of the funding for education statewide which may be used for technology at local discretion.

Twelve regional agencies, forming the Wisconsin Instructional Computing Consortium, provide educational technology services to members (such as training and technical assistance). State staff provide leadership and consultation to the regional units and districts. The State recognizes a need for additional training to integrate technology more fully into the curriculum. Beginning in 1988, the State will work with districts that are not complying with State standards, including those that are not using technology.

Wyoming

State position/unit: Yes (1985)
State plan: No
Key actors: District curriculum committees
Funds available through the State for technology activities: State education; Federal
Source of funding in most districts: District
State training policies: Preservice (required); inservice (recommended)
State funding for technology training: None
Way most teachers receive training: District
Most important State action: Technology position in SDE; center to provide software preview/evaluation
Major changes in past year: Oil prices have negatively affected school funds
Barriers: Isolation/small size of most schools in State; questions about how to encourage teachers to incorporate technology in instruction, especially in high schools

Almost all State funding for education in Wyoming goes directly to districts. Chapter 2 is used heavily by districts for technology, but districts are discouraged from using Chapter 1 funds for technology because it is difficult to monitor use. Districts are encouraged to develop their own plans for educational technology and a State consultant is available to offer assistance. The State maintains the Center for Educational Technology, where software is available for preview. The center also publishes software reviews. Preservice teachers are required to demonstrate familiarity using technology in instruction. A State policy on distance learning was recently adopted and a project is expected to be implemented in one district in 1988-89.