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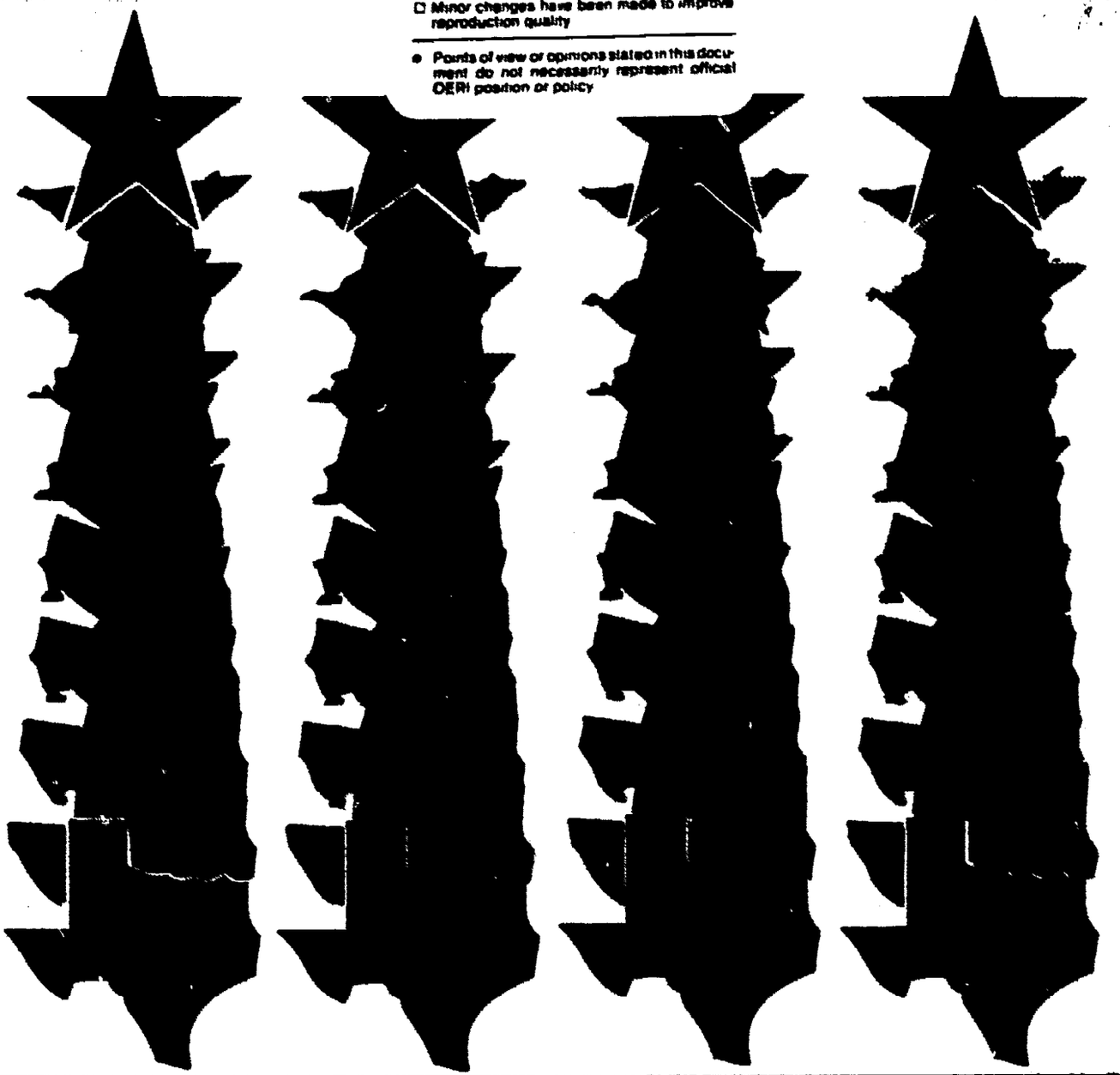
ABSTRACT

Adopted in November 1988, the Long-Range Plan for Technology of the Texas State Board of Education plots the course for meeting educational needs through the application of technology and for implementing concomitant changes in education from 1988 to the year 2000. The plan recognizes that both educational technology and the practice of education are changing and reflects the belief that advances in technology applied to the practice of education can be an effective means of achieving a vision of education that would otherwise be unattainable. The vision of education is one in which: no student is denied course work necessary for employment or higher education; teachers have both the responsibilities and resources to guide the instruction of their students; performance determines advancement; performance and economic status are unrelated; and adults continually enhance their job and life skills. Four priorities established in the original plan are still valid today: classroom instruction; instructional management; distance education; and telecommunications. It is noted that state legislation has provided the statutory authority and the appropriations necessary to take the initial steps for changing the face of education in Texas. This report contains updated information intended to: (1) illustrate the environmental conditions that influenced the creation of the plan and which will influence continued progress toward its stated goals; (2) provide a brief description of the progress made toward the implementation of the plan; and (3) outline requests to the Seventy-Second Legislature which will enable further progress toward achieving the goals of the plan. (25 references) (DB)



A PROGRESS REPORT ON THE LONG-RANGE PLAN FOR TECHNOLOGY

OF THE STATE BOARD OF EDUCATION

TEXAS EDUCATION AGENCY
AUSTIN, TEXAS

MAY 1991

A Progress Report

on the

Long-Range Plan for Technology

of the State Board of Education

Submitted to the Governor, Lieutenant Governor, Speaker And the Seventy-Second Texas Legislature

After an initial free distribution to authorized institutions, additional copies may be purchased for $2.00 from the Publications Distribution Office.

Texas Education Agency
1701 North Congress Avenue
Austin, Texas 78701-1494

State Board Of Education

1701 North Congress Avenue
Austin, Texas 78701-1494
(512) 463-9007

April 1991

The Honorable Ann W. Richards, Governor of Texas
The Honorable Bob Bullock, Lieutenant Governor of Texas
The Honorable Gibson D. Lewis, Speaker of the House
Members of the 72nd Legislature:

Section 14.021 of the Texas Education Code directs the State Board of Education to develop a long-range plan for technology. This plan was adopted by the State Board of Education in November 1988. The measure further requires the board to "biennially report to the governor and the legislature on (1) the equity of the distribution and use of technology under this chapter; and (2) the implementation of and revisions to the long-range plan for technology."

As is evident in the report, Texas has taken a national leadership role in the use of technology in education. The *Long-Range Plan for Technology* itself has served as a model for other states as they have seen the need to address technology in education. Of special interest is the adoption of an Electronic Instructional Media System as a textbook. This action, like many others documented in this report, has received national recognition.

The State Board of Education hereby submits this progress report on the *Long-Range Plan for Technology*.

Respectfully submitted,

Carolyn Honea Crawford, Chairman
State Board of Education

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A Progress Report

on the

Long-Range Plan for Technology

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The Long-Range Plan for Technology of the Texas State Board of Education 1988 - 2000

A Progress Report
Prepared by
The Office for Technology
Department of Research and Development
April 1991

Executive Summary

Adopted in November 1988, the *Long-Range Plan for Technology of the Texas State Board of Education* plots the course for meeting educational needs through the application of technology and for implementing concomitant changes in education from 1988 to 2000. The plan recognizes that both technology and the practice of education are changing and reflects the belief that advances in technology applied to the practice of education can be an effective means of achieving a vision of education that would otherwise be unattainable.

The Vision

The vision of the education system articulated by the State Board of Education in the *Long-Range Plan for Technology* is shared by the current board and remains the vision against which progress in achieving the goals of the plan will be judged.

That vision is one in which:

- No student is denied, by virtue of district wealth or teacher shortage, course work necessary for employment or higher education.
- Teachers have both the responsibility and the technical resources to guide the instruction of their students in the most appropriate and efficient ways.
- Performance, not processes, determines advancement.
- Performance and socioeconomic status are unrelated.
- Adults continually enhance their job and life skills.

Definition

The technologies encompassed in the plan are computer-based systems, devices for storage and retrieval of massive amounts of information, telecommunications facilities for audio, video, and information sharing, and other electronic media devised by the year 2000 that can help meet the instructional and productivity needs of public education.

Priorities

The four priorities established in the original plan are still extant today:

- classroom instruction;
- instructional management;
- distance education; and,
- telecommunications.

Principles

In adopting the plan, the State Board of Education expressed a statement of principles to which the board was committed. Those principles described the relationship the board saw between the use of technology and the education of Texas children and recognized the inherently synergistic nature of the use of technology and the environment in which it is used. Those principles, which are described in Section II of the progress report, remain the basis upon which actions have been taken in the years since 1988, and will be taken in the future, to achieve the educational vision expressed in the plan.

Background

The original plan was developed over a period of many months through the cooperative effort of many individuals representing industry, higher education, school districts, professional organizations and Regional Education Service Centers, as well as staff from the Texas Education Agency. The plan was unanimously adopted by the State Board of Education in November 1988. All of the interest groups represented by the original working committees are still active in the accomplishment of the *Long-Range Plan for Technology*.

The efforts of these interested entities have been substantially augmented by the leadership roles of the State Board of Education and the Legislature in taking actions over the past two years which have significantly moved the state toward the accomplishment of the goals of the *Long-Range Plan for Technology*.

Significant Accomplishments

Significant strides have been made toward the accomplishment of several of the key state actions envisioned as objectives of Phase I, 1988-89 through 1991-92. Those accomplishments are detailed in Table 1 following this summary.

Of particular importance in achieving the actions shown on Table 1 is the passage of legislation which provided the statutory authority and the appropriations necessary to take the initial action steps. Senate Bill 650 passed in the Regular Session of the 71st Legislature, Senate Bill 1 passed in the Sixth Called Session of the 71st Legislature, and Senate Bill 351 passed in the Regular Session of the 72nd Legislature are all statutes which will significantly change the face of education in Texas by demonstrating exceptional commitment to the importance of the infusion of technology into the educational process.

Content of Progress Report

This progress report on the *Long-Range Plan for Technology of the Texas State Board of Education* was developed by staff of the Office of Technology within the Department of Research and Development. The Office of Technology is itself an organizational entity created within the Texas Education Agency as a result of the adoption of the plan and the passage of Senate Bill 650.

The update is intended to:

- illustrate the environmental conditions which influenced the creation of the plan and which will influence continued progress toward its stated goals;
- provide a brief description of the progress made toward the implementation of the *Long-Range Plan for Technology*; and,
- outline requests to the 72nd Legislature which will enable further progress toward achieving the goals of the plan.

Table 1
Proposed State Actions and Significant Accomplishments

Phase I, 1988-89 through 1991-92 Proposed State Actions	Phase I, 1988-89 through 1990-91 State Accomplishments
• Create statute to enable plan	• Senate Bill 650 passed in Regular Session, 71st Legislature • Senate Bill 1 passed in Sixth Called Session, 71st Legislature
• Appropriate funding for implementation	• $6.0 Million appropriated to implement Senate Bill 650 • Technology Allotment Funds not yet appropriated
• Establish a technology equipment allotment of $50 per student per year	• Senate Bill 1 established a Technology Fund • Senate Bill 351 included funds in Foundation School Program * $30 per student per year in 1992 * increasing by $5 per student per year * up to $50 per student per year by 1996 and beyond
• Reinstate support for instructional television	• Not funded
• Establish a statewide Electronic Information Transfer System	• Senate Bill 650 authorized the system • System implementation initiated: February 1991
• Establish a research and development consortium	• Senate Bill 650 authorized the consortium • Center for Educational Technology established: June 1990
• Establish demonstration programs	• Senate Bill 650 authorized the demonstration programs • District demonstration program awards: January 1990
• Expand distance education	• Senate Bill 650 authorized Integrated Telecommunications System • Feasibility study completed: September 1990 • System implementation plan approved: February 1991
• Assist districts with selection and acquisition of equipment through new arrangements with SPGSC	• District use of automated state contracts initiated: January 1991

Table 1
Proposed State Actions and Significant Accomplishments (continued)

Phase I, 1988-1989 through 1991-92 Proposed State Actions	Phase I, 1988-89 through 1990-91 State Accomplishments
• Incorporate courseware adoption into textbook adoption process	• Proclamation 66, issued in 1989, called for "electronic textbooks" • First "electronic textbook" adoption made: November 1990
• Revise curriculum rules to reflect use of electronic media	• Use of electronic media to be addressed in larger revision process
• Use technology in teacher and administrator training in, and use of, technology systems	• Induction year pilot established: July 1990 • Senate Bill 1 established Modern Teaching Practices • Senate Bill 351 mandated staff development in technology
• Establish quality, technical, functional, security, service, and other standards for equipment, courseware, and training	• Senate Bill 650 authorized advisory committee • Advisory Committee on Technology Standards appointed and active

I. Summary of Environmental Conditions

A variety of environmental conditions compelled the adoption and implementation of the present *Long-Range Plan for Technology*. These conditions included economic and social forces in the state and nation, legislative mandates and the State Board of Education's own *Long-Range Plan for Public School Education*. These conditions are still extant today, and indeed argue even more strongly for the creation and maintenance of an increasingly sophisticated and well-educated workforce that demonstrates the technological literacy which is an essential prerequisite for successful competition in the world marketplace. That sophisticated workforce will be created by an educational system which effectively infuses technology into the process of education to produce graduates who use technology as a tool to accomplish meaningful work.

A. Demands for an Educated Workforce

An educated workforce is not merely a desirable objective; it is the essential base supporting the ability to compete in the modern economic community.

1. Economic Factors

The economic factors which are driving the demand for workers who demonstrate higher-order thinking skills, as well as specific job-related competencies such as mathematic, language and communication skills, are much the same today as those noted in the original plan.

Some of these factors are:

- the global economy places the American workforce in direct competition with the best graduates of the educational systems of Japan and Europe in order to maintain and advance the American market position;
- employment in the agriculture and manufacturing sectors continues to decline as the service sector, largely comprised of business, health, information processing and educational professionals, expands;
- employment in much of the service sector requires a higher than average level of educational preparation; and,
- the tools of the workplace are increasingly complex and contain increasingly sophisticated technological components.

2. Legislative Mandates

The legislative mandates which initiated the development and adoption of the *Long-Range Plan for Technology* are still intact and indeed have been even more strongly expressed in subsequent legislation. The mandates of previously existing legislation establishing the Computer Software Advisory Committee and encouraging financial support to the Regional Education Service Centers to create a statewide system of computer services to meet public school educational and informational needs have been continued.

Those initial mandates have been eclipsed by provisions of Senate Bill 650, Senate Bill 1, and Senate Bill 351, all of which provide clear legislative direction for the establishment of a statewide technology infrastructure for public education in Texas and significant funding for both the statewide infrastructure and the local acquisition of technology determined necessary by district and campus level decision processes. The technology-related provisions of these three landmark pieces of legislation will clearly serve as catalysts for accomplishing major portions of the *Long-Range Plan for Technology.*

3. Long-Range Plans of the State Board of Education for Texas Public School Education, 1986 - 1990 and 1991 - 1995

The first State Board of Education *Long-Range Plan for Public School Education* was adopted by the board in 1987. This plan was revised in the fall of 1990 and a new plan covering the years 1991 - 1995 was adopted by the board in November 1990. Accomplishing many of the goals of these two plans necessitate actions that incorporate, if not require, the use of technology.

Two key examples taken from the original plan, which covered the years 1986 - 1990, are noted below:

- Goal 2: Curriculum

  "A well-balanced curriculum will be taught so that all students may realize their learning potential and prepare for productive lives."

  Action by the State:

  "The state will investigate, provide assistance on, and encourage implementation of distance-learning technologies in order to provide a well-balanced curriculum to all students."

- Goal 7: Innovation

  "The instructional program will be continually improved by the development and use of more effective methods."

  Action by the State:

  "The state will coordinate public and private telecommunications systems for delivery of distance instruction and administrative services."

  "The state will implement a system and establish standards for evaluation and equitable distribution of software throughout the education system."

The emphasis on the use of technology expressed in the first plan was continued in the second plan. Two key examples taken from the current plan, which covers the years 1991 - 1995, are noted on the following page.

- Goal 2: Curriculum and Programs

  "A well-balanced and appropriate curriculum will be provided to all students."

  Action by the State:

  "Assist schools in offering a well-balanced curriculum through technology."

- Goal 9: Communications

  "Communications among all public education interests will be consistent, timely, and effective."

  Action by the State:

  "Expand telecommunications systems."

Achieving an educational system hallmarked by the characteristics of quality, equity and accountability is an overriding goal of the board expressed in each Long-Range Plan for Public School Education. The use of technology and providing equal access for all students to technology systems were perceived as key requirements for creating such an educational system; those perceptions are still extant.

A few of the ways in which the use of technology can contribute to the attainment of quality and equity are:

- distance education technologies can provide student access to courses, taught by master teachers, to any and every district in the state;
- student workstations can provide a customized educational experience for every student in the state; and,
- technologies such as integrated learning systems and telecommunication systems can support access to and delivery of curricula and information that expands the universe of the classroom to a wider world.

B. Demands for Technology in Schools

Technology has long been recognized as a principal means by which the vision of an educational system which produces highly qualified graduates can be achieved. The body of research which documents the positive effects of the use of technology in the education process is significant and growing rapidly. Furthermore, as newly emerging technologies build on the strengths of technologies previously proven to be effective, the positive effects of technology, some of which are listed below, are likely to increase.

- Basic skills can be acquired more thoroughly and more quickly with the aid of technology.

- Higher-order skills can be improved with the aid of technology.
- Tech ology can help meet the individual, and special, needs of all students.
- Distance education is a proven means of providing effective instruction, inservice and staff development.
- Costs of improved communications and increased information exchange among schools can be lowered through effective use of statewide telecommunication systems.

C. Changes in the Environment

Several key changes have occurred in the environment impacted by the *Long-Range Plan for Technology*. Some of these changes are reflections of the plan itself; these are changes which arose from the synergy between the environment and the *Long-Range Plan for Technology*. Other changes reflect trends that are not inherently associated with the plan but which do affect the environment in which the plan is implemented. The two major changes instigated and encouraged by the existence of the plan are the adoption of legislation to implement facets of the plan and the effect of the plan's goals upon the districts. The major environmental trends affecting the implementation of the plan are trends related to technology systems themselves and trends associated with restructuring public education.

1. Legislative Support

A major factor in the progress made toward accomplishing the goals and action plans expressed in the *Long-Range Plan for Technology* has been the existence of strong legislative support, which was expressed in three key pieces of statute and buttressed by significant appropriations in a time of fiscal constraint. The three pieces of legislation are Senate Bill 650 passed in the Regular Session of the 71st Legislature, Senate Bill 1 passed in the Sixth Called Session of the 71st Legislature, and Senate Bill 351 passed in the Regular Session of the 72nd Legislature. Each of these statutes are landmarks in the evolution of the use of technology in the public school system and represent significant state commitments to the importance of achieving equity of access to technology for all students in that system.

2. District Impact

While sufficient time has not yet passed to conduct a formal evaluation of outcomes, particularly those related to issues such as student performance, evidence suggests that the adoption of the *Long-Range Plan for Technology* and the supportive actions of the Legislature have focused attention upon the use of technology in the schools and encouraged districts to move forward in adopting and implementing district and campus level technology plans. The goals, targets and action statements expressed in the plan have served as models for districts to incorporate into their own plans and have often served as a significant impetus in convincing school boards and administrators to make investments in technology systems. Many districts have not waited for state funding but rather have, to the greatest extent possible within their own resources, moved forward to achieve the goals of the plan.

3. Technology Trends

Long term trends in technology, such as continued increases in functionality at lower price, will support the goals expressed in the plan. The types of futuristic technology modules described in the plan will become more practically available to schools as trends in miniaturization and multi-media systems result in practical and affordable products which meet those futuristic requirements. Those trends have already made significantly more powerful computers available to students at a lower price than older, less powerful systems.

Continued improvements in the quality of educational software, in conjunction with the availability of powerful and low-cost workstations and networks, will have an increasing impact upon instructional delivery and student learning. The emergence and proliferation of extremely powerful technology-based learning systems will facilitate instruction customized to the individual student and can thus help break the linkage between the process of mass education and the performance of individual students.

The increasing availability of technology-based solutions will not be limited to personal computers and associated software and courseware. Advances in other technologies, such as adaptive devices and robotics, will also have significant impact on learning as students are given access to those tools to assist them in the learning process and prepare them for future employment.

4. Other Trends

Other broad changes in the public school environment will impact the ability of all entities to focus on achieving the goals of the *Long-Range Plan for Technology*. However, many of these changes will be complementary to the actions taken to implement the plan and some will be achieved, at least in part, through the use of technology. These broad changes are those associated with the move to restructure public education: the move to increase local community involvement through business and education coalitions; structured efforts to involve parents in the education of their children; site-based management and local decision-making; and, outcome-based evaluation. Each is a complex process which will significantly impact the public school environment and thus affect the move toward infusing technology into that environment.

II. Statement of Principles and Vision

A. Statement of Principles

In adopting the *Long-Range Plan for Technology*, the State Board of Education expressed a set of principles to which the board was committed. Those principles described the relationship the board saw between the use of technology and the education of Texas children and recognized the inherently synergistic nature of the use of technology and the environment in which it is used.

The principles adopted by the board are listed below.

- Technology is a tool which must be infused into instruction to be effective.
- Technology is one of many tools which must work synergistically to improve education.
- District and campus flexibility in the selection of technologies and applications to meet local needs is essential, as is district and campus accountability for continual improvement in achievement and productivity.
- Incentives for acquisition and implementation must be provided by state and local governments.
- Technology without teachers is ineffective; teachers are essential for achieving and maintaining high-quality education.
- Staff training is absolutely critical to the successful integration of technology into education.
- Future decisions regarding the use of technology must be based upon the results of research.
- Technology itself changes rapidly and sometimes unpredictably, and the technology itself changes the settings into which it is introduced, thus requiring flexibility over time as actions are taken to achieve the plan.

These principles remain the basis upon which actions have been taken in the years since 1988, and will be taken in the future, to achieve the educational vision expressed in the *Long-Range Plan for Technology*.

B. Statement of Vision

The vision of the education system articulated by the State Board of Education in the original *Long-Range Plan for Technology* is shared by the current board and remains the vision against which progress in achieving the goals of the plan will be judged.

That vision is one in which:

- No student is denied, by virtue of district wealth or teacher shortage, course work necessary for employment or higher education.

- Teachers have both the responsibility and the technical resources to guide the instruction of their students in the most appropriate and efficient ways.
- Performance, not process, determines advancement.
- Performance and socioeconomic status are unrelated.
- Adults continually enhance their job and life skills.

Actions taken by the Legislature and the State Board of Education since adoption of the *Long Range Plan for Technology*, in concert with the evolution of technology, have made achieving the vision more certain. While much remains to be done, the journey has begun: this progress report will show how far we have come.

III. Accomplishments Toward Achieving the Phase I Action Plan

Significant strides have been made toward the accomplishment of many of the key state actions envisioned as forming Phase I (school years 1988-89 through 1991-92) of the *Long-Range Plan for Technology*. A brief outline of those state-level accomplishments already achieved at the time of this update, which is being made halfway through school year 1990-91, was shown in Table 1, Proposed State Actions and Significant Accomplishments (pp.4 and 5).

A. Hardware Procurement and Purchase

Fundamental to the accomplishment of the *Long-Range Plan for Technology* is access to the technology itself by all students in all districts. If such access is not uniformly provided, neither the goals expressed in legislative mandates nor the goals expressed in the board's *Long-Range Plan for Technology* and the *Long -Range Plan for Public School Education* will be met.

The original plan envisioned that equitable access to technology would require seven actions during Phase I of the plan.

- Establish a Technology Equipment Allotment.
- Add "technological systems" to those items which can be funded through the Foundation School Program on an equalized basis.
- Establish a statewide Electronic Information Transfer System.
- Establish an Instructional Television Allotment.
- Establish mechanisms to support district purchase of technology systems.
- Establish a State Board of Education Advisory Committee on Technology Standards.
- Adopt standards for hardware.

Each of these actions is addressed in the following sections of this progress report in some detail; where appropriate, discussion of certain items has been combined.

1. Technology Equipment Allotment

Proposed Action:

The *Long-Range Plan for Technology* called for the creation of a Technology Equipment Allotment that would provide $50 per average daily attendance (ADA) per year on an equalized basis to districts to be expended as needed for hardware and courseware purchases and for facilities modification.

Accomplishments:

The Sixth Called Session of the 71st Texas Legislature passed Senate Bill 1, which established a Technology Fund. The provisions of that legislation

are now codified in the Subchapter D, Sections 14.061 through 14.065, of the Texas Education Code, effective September 1, 1992. The Technology Fund was to be initiated at $30 per ADA per year for the 1992-93 school year and is to increase by $5 per ADA per year each year thereafter until 1996-97, when the allotment will reach $50 per ADA per year.

Senate Bill 351, passed during the Regular Session of the 72nd Legislature in April 1991, eliminated a separate Technology Fund while maintaining the incremental increase of funding from $30 to $50. Funding for the technology allotment is now included in Tier 1 of the Foundation School Program and the allocation is therefore fully funded; the allocation to the districts is on a per student basis.

The allotment is to be used only for:

- "the acquisition of technological equipment and related services, including hardware, software, courseware, training, subscription fees for telecommunications and data base services, and other related services; and,

- the research and development of emerging instructional technology."

Expenditure of funds for those purposes is to be monitored by the agency to ensure that at least 75% of the allotment is used to provide classroom instructional services and programs. In order to receive a technology allotment, districts are required to submit a five-year technology plan to the agency and to the Department of Information Resources. Districts are also required to submit an annual report describing: the percentage of the technology allotment spent for classroom instructional services; how the use of the allotment related to the training of district personnel using technology systems; and, how the expenditures are related to accomplishing the goals of the district's five-year technology plan.

Requests for both administrative and program funds have been included in the agency's Legislative Appropriations Request for Fiscal Years 1992-93 to provide staff for the evaluation of district technology plans and to provide the appropriation for the technology allotment itself.

2. Statewide Electronic Information Transfer System

Proposed Action:

The *Long-Range Plan for Technology* proposed the creation of a statewide Electronic Information Transfer System (EITS) to facilitate information exchange by providing to each district the hardware, software, limited on-line access time and training on the use of the system. The EITS was to be acquired by the Texas Education Agency on behalf of the districts through a competitive bidding process.

Accomplishments:

Senate Bill 650, passed during the Regular Session of the 71st Legislature, included a provision, now codified as Section 14.042 of the Texas Education Code, which authorized an Electronic Information Transfer

System. The total appropriation for Senate Bill 650 supported an allocation of $1.2 million, of the requested $3.351 million, for the creation of the EITS.

The agency is in the process of implementing the Electronic Information Transfer System. This network will connect the agency, Regional Education Service Centers, professional organizations, other state agencies, and all school districts and enable exchange of administrative information as well as delivery of curriculum-based telecomputing projects for use by students and teachers. The system is expected to be implemented in all districts by September 1991. Further details regarding this network are found in Section III.D.2 of this progress report.

Funding to continue operation of this network and to significantly expand the programs and services offered through the network were included in the agency's Legislative Appropriations Request for Fiscal Years 1992-93.

3. Instructional Television Allotment

Proposed Action:

The Instructional Television Allotment was envisioned as a means to ensure that districts received public broadcasting and other instructional television services for supplemental course enrichment, teacher assistance, and other information.

Accomplishments:

While no funds were allocated specifically for this purpose, many districts are acquiring the benefits of instructional television (ITV) through subscription to ITV services, paid with local funds, for programming available through public broadcasting and other providers. Currently, there is not an adequate level of state funds to ensure statewide equity in the use of such services. Districts that choose to participate receive from 4 to 8 hours of instructional television supplementary programming per school day. Districts pay public broadcasting stations for such programming at rates of $1.50 to $2.50 per student per year for those services.

The agency also continues to produce broadcasts which deliver information and inservice to district personnel on a weekly basis. The broadcasts are delivered compliments of the TI-IN network, public broadcasting stations and Regional Educational Service Centers.

In addition to traditional ITV supplemental programming and the broadcasts available from the agency, districts continued to subscribe to distance education courses and inservice which are delivered primarily by national providers via communication satellites. In addition, two Texas-only agencies also delivered distance education courses by nonsatellite-based telecommunication facilities to a significant number of high schools. In the fall semester of school year 1990-91, approximately 3200 Texas students were enrolled in 39 distance education courses offered by five approved distance education providers.

The approved providers are:

- InterAct, operated by Regional Education Service Center IV;
- TI-IN Network, originating from San Antonio, utilizing the studio and uplink facilities available at Regional Education Service Center XX;
- Satellite Education Resources Consortia (SERC) of South Carolina;
- Oklahoma State University's ASTS network; and,
- University of Texas Extension College's Educational Instructional Materials Center.

Other national distance education providers are expected to apply for approval to offer courses in Texas within the year.

In addition to the availability of distance education services, other programming has been made available to the educational community in Texas. TI-IN has given approximately 1.5 hours of satellite time to the agency each week to provide inservice programs to Texas educators during the 1990-91 school year. On Mondays from 3:00-3:15 p.m., the agency presents "TIPS," the Texas Education Agency's Information for Public Schools. "TIPS" is a fifteen-minute weekly education news program produced by the agency for Texas administrators, teachers, school staff, and school board members. The program highlights information, issues and items of current interest through live news stories, announcements, and interviews as well as through videotape segments.

Following "TIPS," agency staff present inservice programs on a variety of subjects for the remaining one hour and fifteen minutes of broadcast time. A total of 44 such inservice programs, which provide information about management systems, monitoring, legislation, regulations, procedures, standards, policies, instructional strategies and testing, will be produced during the 1990-91 school year. Specific topics addressed during this period included: accreditation, program compliance, student assessment, certification, teacher recruitment and retention, curriculum development, educational technology, libraries and media centers, textbook adoption and Chapter 1 school improvement.

In a collaborative project with the Austin Public Broadcasting System (PBS) affiliate, KLRU-TV, the agency also co-produces a thirty-minute monthly television program, "The Texas Education Report," which is broadcast simultaneously on all PBS stations throughout the state. This air time is made available to the agency courtesy of the Public Broadcasting System. Some Texas PBS stations also re-air the programs a number of times. In addition, "The Texas Education Report" is now being offered, via satellite, across the country. This pre-recorded program highlights education issues, activities and outstanding school programs in Texas for a broad audience comprised of students, parents, teachers, administrators and members of the public. Moderated by agency staff, "The Texas Education Report" includes an interview with the Commissioner of Education about the latest issues before the State Board of Education and an on-site videotape segment

featuring an outstanding education program in Texas, followed by an in-studio discussion with guests from the featured or related program.

Action has also been taken which will significantly increase the availability of distance education services to local schools, whether through public broadcast or other instructional television producers. The implementation of the statewide Integrated Telecommunications System will provide equipment to districts that will enable them to choose from a wide range of distance education services and will enable the agency to deliver a significantly enhanced program of inservice training customized to the needs of Texas educators. Funding to continue implementation of this system, which is described in Section III.D.4 of this progress report, has been included in the agency's Legislative Appropriations Request for Fiscal Years 1992-93.

4. District Purchase of Technology Systems

Proposed Action:

The plan envisioned a variety of mechanisms to facilitate district acquisition of technology systems. Four such mechanisms were addressed in the plan to assist districts in purchasing computer-based equipment and appropriate maintenance, training and other services selected by the state for instruction and management. The proposed mechanisms included: specific purchase arrangements with State Purchasing and General Services Commission (SPGSC); revision of Section 21.901 of the Texas Education Code, Contracts - Competitive Bidding; establishment of a Buyer's Cooperative; and, development of product specifications by the Texas Education Agency.

Accomplishments:

In 1985, House Bill 1303 implemented statutory changes in Section 21.901 of the Texas Education Code which enabled school districts to access State Contracts established by the State Purchasing and General Services Commission. Approximately 200 districts have chosen to use such contracts and more are expected to do so in the future as products of specific relevance to the educational process are made available on state contracts.

To further encourage use of the SPGSC state contracts, the agency and SPGSC have agreed to pilot direct school district access to the SPGSC Online Automated Contracts System this summer using the facilities of the Electronic Information Transfer System. Use of the Online Automated Contracts System will allow the agency and school districts to enter their own automated contract orders and open market requisitions as well as to check the status of purchasing actions made through the SPGSC. Use of this system to enter orders reduces the turnaround time on orders by as much as three weeks.

The agency has requested administrative funding in the Legislative Appropriations Request for Fiscal Years 1992-93 to facilitate development of contracts for products with specific relevance to school districts. The Legislative Appropriations Request also included a request for program funding to support the activities of a statewide advisory committee, the Standard Contracts Committee. This committee will be convened to work

with a staff person, partially funded by the agency, in each Regional Education Service Center to develop group purchase contracts for use by districts to purchase hardware, software, courseware, and services which meet standards adopted by the board upon recommendation by the Advisory Committee on Technology Standards.

5. Advisory Committee on Technology Standards

Proposed Action:

The plan proposed that the State Board of Education appoint an Advisory Committee on Technology Standards to advise the board on quality, technical, functional, security, service and other standards. The committee was to consult with developers and educators in other states on the development of such standards.

Accomplishments:

The creation of an Advisory Committee on Technology Standards was authorized in Senate Bill 650; that authorization was codified in Section 14.047, Standards for Services and Equipment, of the Texas Education Code. Fifteen educators have been appointed by the State Board of Education to serve on the Advisory Committee on Technology Standards. The committee is examining educational approaches to, and standards for, the use of technology in the classroom. The committee has developed a set of principles to guide the development of standards. These principles recognize the need to establish broad standards, supported by more detailed technical assistance handbooks, to ensure that sufficient flexibility is maintained to accommodate the varied circumstances of the districts while moving the entire system toward certain standards of practice and performance.

Four subcommittees have been formed to consider specific standards for equipment, training and staff development, courseware and other support services. The committee plans to include appropriate industry area representatives to assist the subcommittees in their work. The Department of Information Resources, the State Purchasing and General Services Commission, and the Software Advisory Committee will also participate as appropriate and necessary in the work of the committee. After general standards are developed, appropriate rules and guidelines to implement those standards will be recommended to the State Board of Education. Upon adoption by the board, the standards and guidelines will be published and distributed throughout the public school system in Texas.

Broad standards will be recommended to assist districts in the effective and efficient use of technology in general. These standards will be accompanied by more detailed technical assistance handbooks to assist districts in applying those standards to ensure selection and acquisition of products of high quality. The committee is recommending that each standard be issued as a recommended guideline for one to two years and as a required standard thereafter, to give districts sufficient time to adapt their five-year technology plans to the new standard.

Sources for standards that will impact district technology plans will vary. Some standards will be derived from the goals in the *Long-Range Plan for Technology*. Others will be derived from commonly recognized best practices in the use of technology in the educational community itself. In addition, state level standards adopted by the Department of Information Resources may be recommended for adoption by the public school system. Other standards are likely to result from the work of the Software Advisory Committee and from the award of the contracts for the Electronic Information Transfer System and the Integrated Telecommunications System, as only certain hardware and software configurations can be used in conjunction with those networks. The Advisory Committee on Technology Standards may include such standards in its recommendations to the board.

The committee as a whole determined that the first set of standards developed should be those governing the content and submission of district five-year technology plans. With the passage of Senate Bill 1, districts must submit their five-year technology plans to the agency and to the Department of Information Resources in order to qualify for an allotment from the Technology Fund. The committee will recommend rules governing the submission of plans, application for the technology allotment, and the required annual fund report to the State Board of Education. The proposed rules will be considered by the board for three readings at three successive board meetings. During that period, public comment will be solicited and the rules and guidelines will be modified to reflect board and public comment. After adoption by the board, the rules and guidelines will be published and distributed to the school districts.

The recommended rules will be accompanied by a technical assistance handbook that will illustrate a model plan and a model planning process for producing such five-year technology plans. The technical assistance handbook will also present completed samples of both the application for a technology allotment and the required annual report on the expenditure of such technology allotments.

Funding to continue the work of this committee has been requested in the agency's Legislative Appropriations Request for Fiscal Years 1992-93.

6. Adopt Standards for Hardware

Proposed Action:

The plan proposed that standards for hardware be developed by the Advisory Committee on Technology Standards and recommended to the State Board of Education for adoption to guide districts in acquiring technology products.

Accomplishments:

As noted in Section III.A.5 above, the Advisory Committee on Technology Standards has been appointed and is considering recommendations for standards for adoption by the board. In accordance with statute, however, the committee does not intend to limit development of standards to hardware

alone. The first set of standards will address requirements for submission of district five-year technology plans and annual reports on expenditures made with a technology allotment.

B. Courseware Adoption and Provision

As technology infuses schools, Electronic Instructional Media Systems (EIMS) will begin to supplant traditional textual materials. Such Electronic Instructional Media Systems will convey the entire course content and meet the essential elements for the curricula in which used, just as do traditional textbooks. In addition, use of courseware, which addresses multiple areas of a specific curriculum, and software, which addresses a single specific topic in a specific curriculum, will continue to supplement traditional textbook-based curricula. The use of products such as software, courseware and Electronic Instructional Media Systems significantly expands the classroom experience. The use of EIMS in particular will continue to grow because of its ability to deliver high quality visual images and corresponding audio experience to complement and enhance the curricular material.

The original plan envisioned that the textbook adoption process would require amendment to include the adoption of technology-based products such as software, courseware and Electronic Instructional Media Systems. The plan also recognized the synergistic relationship between technology and the environment in which it is used and thus anticipated that changes in rules governing supporting structures, such as essential elements and minimum class time, would also be required.

The introduction of software, courseware and Electronic Instructional Media Systems into the educational process was envisioned to require the following ten actions during Phase 1 of the plan.

- Amend textbook adoption procedures and rules to include courseware.
- Review the textbook adoption process in light of the inclusion of courseware.
- Establish the Advisory Committee on Technology Standards to advise the board on standards for courseware.
- Adopt standards for educational courseware.
- Approve existing software and courseware based upon recommendations of the Software Advisory Committee.
- Incorporate information on courseware and other technology-based instructional tools.
- Incorporate information on public broadcasting and other distance education programs into curriculum frameworks and course guidelines.
- Include electronic media in Proclamations 67 and 68.
- Review and revise curriculum rules affecting supporting structures such as essential elements and minimum class time to reflect the impact of technology-based curricula.

- Investigate and implement state licensing and electronic delivery of software to districts for preview and instructional use.

Each of these actions is addressed in the following sections of this progress report in some detail; where appropriate, discussion of certain items has been combined.

1. Textbook Adoption

Proposed Action:

The plan proposed that the textbook adoption procedures and rules be amended to include software, courseware, or Electronic Instructional Media Systems. The plan recommended similar changes be incorporated in the textbook adoption process.

Accomplishments:

The textbook adoption procedures have been revised to facilitate the state textbook committee's review of Electronic Instructional Media Systems. No rules have been amended yet to accommodate the use of Electronic Instructional Media Systems.

On November 10, 1990, the State Board of Education adopted the first Electronic Instructional Media System ever adopted in Texas - or in the nation - by adopting *Windows on Science*, a videodisc-based program for elementary science developed by Optical Data. School districts seem to be embracing this alternative to a traditional textbook to a greater degree than expected. Final figures will not be available until after publication of this document, but as of this writing the agency projects that *Windows on Science* will be in use by approximately thirty percent of the elementary science teachers in Texas, who will be using this videodisc-based program as the primary delivery system of instruction. Other states, including West Virginia, Utah, Virginia, Oklahoma, Kentucky, Georgia, and Montana, have requested information on revision of procedures to mimic what Texas has done.

The state has amended the law to encourage the adoption of Electronic Instructional Media Systems. In 1987, the legislature amended the definition of textbook to include, "...computer software, including but not limited to applications using computer assisted instruction, interactive videodisc, other computer courseware, and magnetic media provided that these can be delivered in lieu of textbooks with similar costs to the state." Senate Bill 1, passed during the Sixth Called Session of the 71st Legislature in 1990, eliminated the phrase, "provided that these can be delivered in lieu of textbooks with similar costs to the state," thus acknowledging that the development of "magnetic media" can cost more than the development of a traditional textbook.

2. Advisory Committee on Technology Standards

Proposed Action:

The plan proposed that an Advisory Committee on Technology Standards be established to recommend standards to the board for their adoption.

These recommendations were to include educational and technical standards as well as other appropriate considerations to ensure that full consideration was given to the instructional, management and inservice needs of Texas educators.

Accomplishments:

As noted in Section III.A.5, the Advisory Committee on Technology Standards has been appointed and has begun its work. While courseware standards have not yet been addressed by this committee, a subcommittee formed to consider recommendations for courseware standards will begin that work during the summer of 1991.

3. Software Advisory Committee

Proposed Action:

The plan suggested that the State Board of Education approve specific software and courseware based upon recommendations of the Software Advisory Committee.

Accomplishments:

The Software Advisory Committee appointed by the State Board of Education is meeting to address the charges given the committee, described in Chapter 14, Subchapter A, Computer Software Advisory Group, of the Texas Education Code. To date, the committee has examined in great detail two of its specific charges: the development and implementation of "a system under which the group continuously evaluates computer software for use in public school classrooms"; and, the recommendation of "software which should be approved and acquired for use in the classroom." Since there are a virtually countless number of educational software products on the market, the committee examined existing services available which address these two specific topics. The committee concluded that the use of a service which specifically and continuously addressed the review and evaluation of educational software and courseware was both appropriate and prudent.

The Software Advisory Committee is presently developing a recommendation to acquire a process which could be used to evaluate and recommend software and courseware for district use for consideration by the State Board of Education. The committee does not plan to recommend specific software or courseware for statewide adoption. Rather, the Software Advisory Committee, in conjunction with the Advisory Committee on Technology Standards, plans to adopt criteria and standards which districts can use to ensure that software and courseware they purchase meets minimum criteria for quality and functionality. However, as a result of the committee's work in addressing the development of a process for software evaluation, the committee will also present to the board a collection of software and courseware titles which has been selected through an independent evaluation process and rated as high-quality solutions for specific instructional purposes.

As a result of their study and evaluation of competitive services, the Software Advisory Committee will recommend to the State Board of Education that Texas join a consortium of other states who have joined together to address the problems associated with selection and evaluation of software and courseware. Educational entities in Michigan, New York, Utah, and Georgia have established a consortium, the States' Consortium for the Improvement of Software Selection, which has commissioned the Educational Productions Information Exchange Institute (EPIE), a not-for-profit consumer-supported agency, to develop a structured process both for the evaluation of educational software and courseware and for the identification of the best of the available products. The consortium product is available to consortium members as a database online, on disk in both Macintosh and MS-DOS formats, and in book format. The product includes over 11,000 educational software and courseware titles. In addition, a subsequent review process produces a smaller subset of approximately 3,000 software and courseware products titled "The Latest and Best" which is also available on multiple media. As members of the consortium, states have input into both the continued evaluation of software and courseware products and the recommendation of approved products that meet the needs of member states.

At the May 1991 meeting of the State Board of Education, the Software Advisory Committee will recommend that the board authorize the agency to join this consortium. At that time, the materials will be available for distribution to all entities of the public education system as well as all institutions of higher education and public libraries in this state. The materials are updated on a regular basis and provided to consortium members as a part of the consortium membership fee. If the board approves the recommendation, the committee will study ways that the selected product can be distributed to and used most effectively by teachers and administrators.

After this process is complete, the committee will focus on its third task which is to "cooperate with designers and publishers of computer software in developing and making available computer software suited to classroom use." As noted earlier, the Software Advisory Committee plans to adopt criteria and standards which districts can use to ensure that software and courseware they purchase meets minimum criteria for quality and functionality. In addition, the committee will work with appropriate industry representatives both to develop new products and to encourage modification of existing products adapted to Texas-specific needs, such as reference to the Texas essential elements. Appropriate industry representatives will be involved in the development of such criteria and standards. Recommendations resulting from the work involved in this third task will be brought to the board for action over a period of time.

4. Curriculum Frameworks

Proposed Action:

The plan recognized that effective infusion of technology into the educational process required changes to specific curriculum frameworks to reflect the use and impact of technology, including distance education courseware supplied by the Public Broadcasting System (PBS) and other

providers, in delivering those courses. The plan proposed that both curriculum frameworks and course guidelines be modified as appropriate to provide information on computer-based and distance education resources, textbooks, and courseware as well as on other technology-based instructional delivery and instructional management materials.

Accomplishments:

The infusion of technology into the educational process is being accomplished through the inclusion of technology-related information in revised curriculum framework documents. The amount and diversity of such information included in these frameworks is on the increase in documents that reflect more recent publication dates. An example of this recognition of the importance of technology in all curricula is found in the framework for Geometry entitled Guidelines for Teaching Geometry, which was published in the summer of 1990. In this framework, statements are made that a major thrust of Geometry is the integration throughout the course of the use of current technology, including calculators and computers, and that students should use calculators and computers as problem-solving and discovery tools whenever possible. Two additional examples of curriculum frameworks reflecting an increased awareness of the role of technology in the instructional process are the new frameworks for languages and art. In these documents, suggestions are made for the use of software and courseware in those curricula, as well as use of distance education courses, to improve the quality of instruction.

In addition to the formal framework documents, conferences and workshops conducted by agency staff representing specific subject areas reflect increased attention to the use of technology for instructional purposes. Technology-related activities either have included special interest sessions or have been the focus of the entire program. Professional meetings attended by teachers and administrators have, as part of their agendas, also shown an increased focus on the use of technology as a primary instructional strategy in delivering quality educational programs.

5. Proclamations 67 and 68

Proposed Action:

The plan recommended that electronic media be incorporated into instructional and management materials as appropriate for textbooks adopted in Proclamations 67 and 68.

Accomplishments:

Proclamation 66, adopted by the State Board of Education on March 12, 1989, called for the adoption of Electronic Instructional Media Systems for elementary science and for computer literacy, as well as for microcomputer applications in support of other curricula. Proclamation 67, adopted on March 10, 1990, stated that Electronic Instructional Media Systems may be submitted for any of the subjects and courses called for in Proclamation 67. Proclamation 68 had similar language, and it is the intent of the agency and the State Board of Education to include such language in every textbook proclamation in the future.

6. Revised Curriculum Rules

Proposed Action:

The plan recommended that the scheduled review of Chapter 75 rules include revisions recognizing the importance of technology skills needed by citizens in the next century. For example, essential elements were to be revised to reflect new knowledge requirements. Areas affected by the instructional use of technology, such as the minimum class time required for promotion and graduation, were also to be revised to reflect individualized student progress.

Accomplishments:

The scheduled review of Chapter 75 essential elements has reflected a strong input from the education community to incorporate the use of technology to enhance the instructional process. The results of these efforts will be finalized with the review and adoption of the recommendations by the State Board of Education in late 1991. Pending approval of the revised essential elements, the revision of curriculum frameworks for the core subject areas will be undertaken. Proposed plans and budgets have been developed to accomplish framework revisions.

7. State Licenses and Electronic Delivery

Proposed Action:

The plan recommended that state licenses for software and courseware be investigated and implemented if appropriate. Electronic delivery of software to districts for preview and instructional usage was also to be considered if appropriate.

Accomplishments:

No action has been taken to date. The Software Advisory Committee is considering these and related issues as appropriate to its work. Electronic delivery of software to districts will become more feasible with the implementation of the Integrated Telecommunications System, discussed in Section III.D.4, which will link all entities of the public education system.

In its Legislative Appropriations Request for Fiscal Years 1992-93, the agency has requested funding for Technology Preview Centers to be located in each Regional Education Service Center. These centers would, among other things, serve as points of distribution for software, courseware and Electronic Instructional Media Systems for preview and testing by district personnel. The Software Advisory Committee is discussing mechanisms such as the use of loan arrangements for placement of products into these Technology Preview Centers and will then open a dialog with providers of software, courseware, and Electronic Instructional Media Systems to determine those most practical and beneficial.

C. Training and Certification

Fundamental to the successful introduction of technology into the educational process is the development of appropriate skill levels in the use of technology by educators. Both preservice and inservice instruction was thus seen as a critical component in the effective infusion of technology-based instruction into schools.

Such inservice instruction was envisioned to consider and address the thoughtful and seamless integration of technology into both instructional and administrative processes rather than mere exposure to the mechanics of operating the technology.

The original plan envisioned thirteen actions necessary to provide appropriate preservice and inservice training to all participants at all levels in the process - administrators, teachers and members of school boards - during Phase I.

- Implement standards for administrator certification which include training in the use of technology in management and instruction.
- Consider including an evaluation component in administrator appraisal instruments regarding the actual use of technology in management and instruction.
- Consider adding instruction on the use of technology in administrator instructional leadership training.
- Train Regional Education Service Center staff and other trainers in district planning for technology and in meeting keyboarding requirements.
- Revise preservice requirements to address integration of technology into education.
- Incorporate, as appropriate, the use of technology into induction year training.
- Establish summer institutes for training educators in the use of technology in instruction and instructional management.
- Establish certification requirements for teachers who deliver courses by distance to Texas.
- Establish certification requirements for out-of-state providers delivering courses through distance education technology.
- Establish school board member training in technology.
- Use distance education technology to deliver training on topics such as legislative and regulatory requirements.
- Establish a State Board of Education Advisory Committee on Technology Standards.
- Adopt standards for workstation training materials.

Each of these actions is addressed in the following sections of this progress report in some detail; where appropriate, discussion of certain items has been combined.

1. Administrator Certification

Proposed Action:

The plan recommended that standards for administrator certification be changed to include provisions reflecting the need for training in the use of technology in management and instruction. The plan also proposed that an evaluation component be added to administrator appraisal instruments to address the use of various technology systems in management and instruction.

Accomplishments:

At present, agency requirements for administrator training in the use of technology do not exist. However, the Texas Administrative Code 137.371, Subchapter J, Program Requirements for Professional Certificates, includes computer applications to education as an option block for administrator certification. It is anticipated that the use and integration of technology applications both as management and instructional tools will be required in the future.

While no technology requirements currently exist in approved university-based programs for certification, program requirements for alternative certification for administrators do explicitly require knowledge of computer applications in education.

2. Administrator Instructional Leadership

Proposed Action:

The plan recommended that instruction on the use of technology be added as a component of administrator leadership training.

Accomplishments:

Instruction on the use of technology is not currently a required component for Instructional Leadership Training for administrators.

Senate Bill 1 contained provisions that established inservice training requirements for principals related both to making district-level decisions and to the use of technology and effective teaching practices. These provisions were codified in the Texas Education Code in the following sections: Section 13.049 (b) Modern Teaching Practices; Section 13.352 (d) (5) Principals; and, Section 13.353 (e) Management Skills and Practices.

3. District Planning for Technology

Proposed Action:

The plan recognized the importance of training for district staff both to help them successfully plan for technology and to help them meet keyboarding requirements. The plan further suggested that Regional Education Service Center staff be trained to serve as resources to district staff.

Accomplishments:

Much work has been done to assist districts in planning for the use of technology and for meeting keyboarding requirements. The agency has assumed a leadership role in requiring that district and campus level technology plans be developed and in providing training for such planning. Materials were developed by agency staff to assist districts in developing district and campus technology plans. Using these materials, training for both Regional Education Service Center and district personnel was conducted by agency staff during the fall of 1988 and the spring of 1989. Over 250 individuals were trained both to replicate these training sessions and to facilitate planning in their schools and regions.

Provisions of Senate Bill 1, later codified as Section 14.065 of the Texas Education Code, also addressed technology planning. These provisions required districts to submit five-year technology plans to the agency and the Department of Information Resources in order to qualify for an allocation from the Technology Fund created by that legislation. Annual reporting is also required on the expenditure of those funds, particularly in regard to the relationship to training district staff in the use of technology. To assist districts in the preparation of effective plans, the Advisory Committee on Technology Standards is developing a technical assistance handbook that will describe the components of an effective technology plan and planning process. This handbook will supplement rules governing submission of plans and reports which will be recommended to the State Board of Education at the June 1991 board meeting.

Keyboarding training was also developed by the agency in its role in providing leadership technical assistance, since elementary keyboarding is an integral element of district and campus technology plans. Agency staff developed both keyboarding curricular materials and keyboarding training. The training of trainers model was used at the Regional Educational Service Centers to disseminate materials and provide hands-on training for elementary keyboarding. Over 250 individuals were trained to provide keyboarding in their regions. Regional Education Service Centers continue to offer keyboarding training as a service to schools in their regions.

Plans are currently in progress for development of Pre- and Post -Keyboarding curricular materials in various content areas. Such curricular materials will be developed and training will be provided on the use of those materials as appropriate. A train-the-trainers model involving ESC, agency and district staff will be used to ensure wide dissemination of information and skill in Pre- and Post-Keyboarding curricula.

The agency is continuing to provide leadership technical assistance to districts in technology planning. Administrative funds have been requested through the Legislative Appropriations Request for staff to coordinate support to the districts, which may be provided by Regional Education Service Centers, vendors, professional organizations or other qualified entities. Such support will be targeted toward those districts whose submitted five-year technology plans indicate that the district needs such assistance. In addition, as noted earlier, the Advisory Committee on Technology Standards is addressing the components of an effective planning process through its recommendation of standards for district five-year technology plans.

4. Preservice Requirements

Proposed Action:

The plan stated that preservice requirements should be reviewed and revised to accommodate the integration of technology into the educational process.

Accomplishments:

Senate Bill 1, passed during the Sixth Called Session of the 71st Legislature, contained a provision on Modern Teaching Practices, now codified as Section 13.049 of the Texas Education Code. That Section 13.049 (a) states, "Standards adopted under Section 13.032 or 13.035 of this code for teacher training shall include training in the use of technology and effective teaching practices in the classroom." Agency staff have met with the Commission on Standards for the Teaching Profession to develop approaches to implement the provisions of Modern Teaching Practices.
In addition, a number of technology companies have developed initiatives to foster effective use of technology in education. Most of these initiatives focus on awareness sessions and operating instructions for those who have purchased equipment. Many of these efforts involve simply offering significantly lower prices to both inservice and preservice teachers and administrators. Other initiatives are directed at higher education, particularly colleges of education.

However, still other efforts are significantly more long-term and constitute true partnerships between business and education. One such initiative is the Christopher Columbus Consortium (CCC), sponsored by Apple Computer, Inc., which is an exemplary model of a business and education partnership designed to introduce and support the effective use of technology systems in the school environment.

The Christopher Columbus Consortium was an idea, first stated during the development of the *Long-Range Plan for Technology*, that acknowledged the importance of close cooperation between and among the technology business community, institutions of higher education, and the public school system to a achieve common purpose. The CCC is composed of approximately fifty institutions of higher education across the country, each with a partner school district. There are two members of CCC in Texas: the University of North Texas and partner district Hurst-Euless-Bedford ISD; and, the University of Texas at Austin and partner districts Eanes ISD and Austin ISD. These Texas members were two of the six charter members of the consortium. The basic working structure of the consortium is described below.

An institution of higher education with an established college of education is selected by Apple Computer, Inc. That college of education in turn selects a school district, or in some cases a particular campus, as a working partner. Apple Computer, Inc. supplies computers, printers, software, training and support at no cost at levels which match the commitments of each college of education and partner district. With the technology base in place, each institution of higher education commits to: use the technology in both teaching education courses and in teaching how the use of technology can affect the teaching and learning environment; and, work with their district or campus partners in effectively using the technology in the school setting. This work often includes providing courses for teachers and administrators and developing specific teaching modules, as well as cooperating on research projects. All parties in CCC are committed to disseminating information resulting from these partnerships. For example, students from Hurst-Euless-Bedford publish a newsletter for all members of the consortium. In addition, consortium members plan to meet annually to share information from all partnership projects.

5. Induction Year Training

Proposed Action:

The plan recommended that teacher induction year training include training on the use of technology in both the instructional process and instructional management.

Accomplishments:

Senate Bill 650 authorized pilot projects for induction year support. These provisions were codified in Section 14.045 of the Texas Education Code and direct the State Board of Education to "establish one or more pilot projects to investigate the effective utilization of technology for the purpose of implementing the teacher induction year."

First Class, a pilot project with just that objective is now in progress. In that project, telecomputing services are used to support induction year teachers. This pilot is a part of the Beginning Teacher Induction Plan for Texas schools and is designed to improve the performance of beginning teachers through a comprehensive system of support and training in the first year of teaching. The pilot includes supervision of twenty-eight induction year teachers from rural schools surrounding Huntsville. The supervision is shared by experienced teachers, school administrators and faculty of institutions of higher education. The pilot is designed to take advantage of the existing telecomputing system to link those teachers with experienced teachers and administrators in those school districts as well as with Sam Houston State University, Texas A&M University and the Region VI Education Service Center.

In addition, the agency has requested substantial funding to continue induction year programs, including the use of technology as appropriate, in its Legislative Appropriations Request for Fiscal Years 1992-93.

6. Summer Institutes

Proposed Action:

Summer Institutes were recommended as a means to train teachers in the use of technology instruction and instructional management. The plan envisioned that such institutes would feature teachers knowledgeable in the use of technology in their own classrooms; those teachers would share such knowledge and train other teachers to successfully integrate technology into their instructional delivery.

Accomplishments:

Funding for stipends to attend Summer Institutes was originally included in the fiscal note supporting Senate Bill 650 as a part of the request to establish a Technology Preview Center at each Regional Education Service Center. While an allocation of funds was not made for this purpose, some progress has been made toward the goal of providing training in the use of technology to Texas educators. The Texas Center for Educational Technology plans to offer two Summer Institutes in 1991. Attendance at these Summer Institutes will be funded by the Texas Center for Educational Technology through stipends given to those educators selected to attend.

A "Special Problems" course for 3 hours of graduate credit will be offered at the University of North Texas by the Texas Center for Educational Technology. This course, which is designed for teachers in all content areas, will present the results of Center research and seek input from attending teachers for appropriate classroom applications of the results of that research. The information gathered during this "Special Problems" course will be added to the research reports and disseminated to members of the Center.

In addition, a workshop will be offered at the University of Texas in Austin, under the direction of the Texas Center for Educational Technology. This workshop, which counts for 15 hours Advanced Academic Training, will provide training and instruction to teachers of Language Arts and English in the use of technology to enhance process writing skills. Additional formal course work and workshops in other content areas will be offered in the future, as funding permits.

In addition, funding to establish Technology Preview Centers has been included in the agency's Legislative Appropriations Request for Fiscal Years 1992-93. Part of that request includes matching funds to be provided to each preview center for the acquisition of equipment, software, and courseware and the development of an ambitious program of Summer Institutes using those facilities.

7. Distance Education

Proposed Action:

Certification requirements for both instructors and providers of distance education to Texas schools were proposed in the original plan.

Accomplishments:

While special "certification standards" have not been developed for distance education teachers, state requirements for teachers of distance education courses are in place and have been applied to the distance education approval process for several years. Likewise, guidelines are in place and have been used to evaluate the qualifications, policies and resources of providers of distance education courses. The Commissioner of Education has also taken the initiative in seeking cooperation and relief for state-specific or inappropriate certification criteria which have been applied to distance education instructors by other states. (For example, other states often require that Texas teachers of distance education courses originating in Texas be certified in the receiving state; often this means that a Texas distance education teacher must take a blood test or a course in the history of the receiving state in order to receive certification in that state.) Texas guidelines for distance education delivery programs have been used as a model by several other state departments of education as they developed their own approval process.

8. School Boards

Proposed Action:

The plan recommended that school board member training in technology be adopted as a priority of the State Board of Education.

Accomplishments:

The State Board of Education has not yet adopted school board training in technology as a priority, but the Texas Association of School Boards (TASB) has begun an initiative to include technology as a component of training for its members. TASB holds a series of training sessions called Spring Workshops every year. For the past two years, TASB has included a technology strand as part of these workshops. The strand has been well attended and well received. The annual fall conference sponsored jointly by the Texas Association of School Administrators and the Texas Association of School Boards for the past several years has also included a pre-conference workshop on technology as well as a strand on technology during the conference. TASB has also held two one-day seminars on technology at the Infomart in Dallas. These seminars were attended by a total of approximately 275 people. Finally, TASB has a technology unit that has provided technical assistance to a number of districts and complete workshops to two school boards.

9. Delivery of Training

Proposed Action:

The plan recommended that public broadcasting and other distance education delivery providers be used to train teachers and other regional and local staff on topics such as legislative and regulatory requirements.

Accomplishments:

As noted in the discussion of the Instructional Television Allotment in Section III.A.3, the agency has been quite active in providing training to district personnel through use of broadcast facilities available through PBS and through TI-IN. "TIPS", the agency's fifteen-minute weekly education news program broadcast statewide on the TI-IN Network, provides a brief informational overview to educators and local staff on potential and finalized changes in state law and State Board of Education rule affecting education in the state.

Many topics covered briefly on the TIPS programs are then also explored in detail in thirty to sixty-minute interactive programs produced by agency staff and broadcast via TI-IN. Titles from this year's schedule include:

- 1990-91 Compliance Monitoring Workshop
- Implementation of an Equivalency Examination Pilot Program (2-part series)
- Transition Programming for Students with Handicaps
- Innovative Practices for Maintaining Special Needs Students in the Regular Environment
- Gifted and Talented: The State Plan, Guidelines, and Rules
- Chapter 1 School Improvement Plans: How to Plan, Implement, and Evaluate (2-part series)
- Textbook Adoption 1990-91: 1-8 Math and Science (2-part series)
- American Sign Language
- Preferred Signs for Instructional Purposes
- The Library Media Program and the Accreditation Process
- Using Young Adult Literature in the Middle School
- The State Board of Education's Long-Range Plan for Public Education, 1991-95
- Coordinated Prekindergarten/Child Care Programs
- The Texas Master Teacher Examination
- Alternative Certification for Administrators
- Preparing for the Reading Portion of the TAAS
- How to Interpret Results from the TAAS 1990
- Elaboration and Its Importance on the TAAS Written Composition
- TAAS and the Writing Process: A Composition Handbook (2-part series)
- The New Advisory Committee on Technology Standards
- Implementing the Integrated Telecommunications System in 1991
- The Texas Center for Educational Technology
- Technology Demonstration Sites
- Update on the Electronic Information Transfer System
- Dyslexia Update
- Certification: A Compliance Vehicle
- Meeting the Challenges of Migrant Students, Ages 3-21
- National Requirements for Migrant Program Evaluation
- Accessing New Resources for Educating Homeless Students
- Creating Integrated English Units
- Recruitment and Retention: Increasing Minority Participation
- The Quest for Quality in Business Education
- State Board of Education Review (7-part series)

Tapes of these broadcasts are also available to every school and ESC in the state on videotape. In addition to tapes of broadcast programming, additional audio and video series and ad hoc materials are produced or

acquired by the agency and duplicated and distributed directly to school districts and Regional Education Service Centers. Such materials include training tapes, staff development programs, informational presentations, instructional support and public service announcements.

The agency is also able, through the courtesy of the public broadcasting system, to use the facilities of public broadcasters in Texas to disseminate information to the wider education community. As noted in Section III.A.3, "The Texas Education Report"is broadcast on all PBS stations across the state as well as for satellite pick-up across the country. Examples of topics and programs which have been presented in "The Texas Education Report" include: at-risk student intervention; teaching critical thinking skills; high expectations/high achievement; education finance; drug use prevention; technology in the classroom (a variety of approaches, teaching strategies and uses); and, parental and community involvement.

The amount of video programming focused toward the needs of Texas educators will be increased to three hours weekly during the 1991-92 school year and up to six hours weekly in subsequent years. The additional time will allow treatment of topics not yet addressed and permit the expansion of topics discussed in previous seasons into regular monthly segments or multi-part series integrated with applications available on the Electronic Information Transfer System.

Some of the subjects suggested for development into video programs or series include:

- Academic excellence indicators
- Accreditation
- Compliance monitoring (perhaps a special strand for administrators)
- Textbooks (various facets of adoption and ordering)
- High school equivalency examinations
- Student assessment
- Teacher education and certification
- Teacher testing
- Certification for administrators
- Instructional methods
- School financing
- Educational technology (methods, management, statewide systems and resources)
- Special programs
- Library and media center services

Training described in this section will be made available through the facilities of the Integrated Telecommunications System (ITS) described in Section III.D.4. As districts receive ITS equipment, the audience presently reached by means such as TI-IN or PBS will be expanded. Such programming can also be delivered into the home via cable systems when and where available.

The Advisory Committee on Technology Standards has recognized the importance of training to all aspects of successful use of technology systems in education. Technology training cannot address just the technology itself; to be successful, the training must address the concepts involved in

successfully educating and learning through use of technology. To that end, among concerns that will be addressed by this committee as it develops standards for technology training are: times of the work day when teachers or administrators are most receptive to learning; timely follow-up activities which utilize concepts learned during training; and, conceptual training which includes global views of technology applications and the relationship of those applications to the educational process.

10. Technology Standards

Proposed Action:

The plan suggested that an Advisory Committee on Technology Standards be appointed by the State Board of Education and that the board adopt standards for workstation-based training and training materials.

Accomplishments:

As noted earlier, the Advisory Committee on Technology Standards has been appointed. This committee has created a subcommittee which is addressing training and staff development requirements and materials for all areas of technology.

D. Delivery Systems

The original plan envisioned creation of a statewide technology infrastructure to enable sharing and exchange of information between and among all entities of the public education system.

Nine actions were proposed to properly establish the necessary statewide information sharing infrastructure during Phase I of the plan:

- Cooperatively investigate and plan appropriate statewide telecommunications systems with other state agencies and institutions of higher education.
- Coordinate telecommunications systems for instruction, inservice and electronic mail with the Public Education Information Management System (PEIMS) and the Department of Information Resources (DIR).
- Establish a statewide electronic information transfer system and establish procedures for replacing postal service with electronic delivery of documents to districts.
- Establish an Instructional Television Allotment.
- Expand integrated telecommunications systems by building on public broadcasting and other existing distance education mechanisms.
- Adopt standards for telecommunications delivery systems.
- Implement, as appropriate, state licensing and electronic delivery of software to districts for preview and instructional use.

- Collaborate with other states and with the federal government in the electronic transmission of software, programming and other information.

- Use distance education delivery systems to train regional and local staff in topics such as legislative and regulatory requirements.

Each of these actions is addressed in the following sections of this progress report in some detail; where appropriate, discussion of certain items has been combined.

1. Coordinate Statewide Telecommunications Systems

Proposed Action:

The plan proposed that investigation of statewide telecommunications systems proceed in coordination with other state agencies and institutions of higher education. The plan further suggested that proposed statewide networks be coordinated with plans for the Public Education Information Management System.

Accomplishments:

The current plans developed for the implementation of the Electronic Information Transfer System and the Integrated Telecommunications System take advantage of existing state resources available from other agencies as well as from institutions of higher education. The agency's plans have also been coordinated with internal divisional staff such as those involved with PEIMS, school library services, special populations, and public information. For example, a collaborative effort is already in place to establish relational databases which contain views of PEIMS data for access through the statewide networks and discussions have begun for planning the development of school district database software to facilitate mini-PEIMS for local applications that are technologically compatible with the Integrated Telecommunications System.

Requests for Advance Certification of both statewide networks have been submitted to the Department of Information Resources for their review and approval. Discussions have been initiated with DIR staff to assure comprehensive interagency planning for joint leasing of satellite transponder time and the eventual ownership and operation of network satellite hub facilities. Similar discussions have been held with the Telecommunications Division of the State Purchasing and General Services Commission. Preliminary discussions have also been held with staff at agencies such as the Department of Human Services, the Department of Health, and the Texas Rehabilitation Commission regarding their interest in using Integrated Telecommunications System and Electronic Information Transfer System facilities to meet their specific needs.

The kinds of projects which could be addressed using these facilities include the examples which follow. Schools with receive only satellite dishes for video broadcast might serve as locations for night and weekend television delivery of community training in health or child abuse

programs. As resources allow, other state agencies may use uplink and/or studio facilities acquired by the agency for distance education and inservice of Texas educators. The digital send and receive satellite dishes on the Integrated Telecommunications Systems network might also be shared as a data communications link in rural communities in which other state agencies also need to provide services. Electronic bulletin board and conferencing facilities could also be used by other agencies. As an example, the Department of Health could establish a bulletin board of public health notices specific to interests of Texas educators using the facilities of the Electronic Information Transfer System.

2. Electronic Information Transfer System

Proposed Action:

The plan proposed creation of a statewide system to share electronically both instructional and administrative information between and among the entities of the public education system in Texas. The system was intended to enable electronic distribution of documents under a certain length to all districts in Texas and the plan recommended both that equipment be purchased for the districts to access the system and that the access time necessary to deliver mail from the agency to the districts be provided at no cost to the districts.

Accomplishments:

Senate Bill 650, passed during the Regular Session of the 71st Legislature, included a provision, now codified as Section 14.042 of the Texas Education Code, which authorized an Electronic Information Transfer System. The total appropriation for Senate Bill 650 supported an allocation of $1.2 million, of the $3.351 million requested, for the creation of the Electronic Information Transfer System (EITS).

The Texas Education Agency is in the process of implementing the EITS. This network will connect the agency, Regional Education Service Centers, professional organizations, other state agencies, and all school districts and enable exchange of administrative information as well as delivery of curriculum-based telecomputing projects for use by students and teachers. The system will provide capabilities for electronic mail, bulletin boards and conferences as well as limited data/form/file transfer and database inquiry capabilities for both data and text databases. The capabilities of the EITS will be complemented by the facilities of the Integrated Telecommunications System to ensure both a wide range of services and equity of access to those services by all districts in the state.

In February 1991, the State Board of Education approved the agency's plan to implement the EITS through a collaborative effort with The University of Texas at Austin and the Texas Center for Educational Technology. An interagency contract has been signed with The University of Texas at Austin for use of THEnet (The Higher Education Network) facilities for transmission and for both help desk and system operations services. An interagency contract has also been signed with the

University of North Texas. Under the terms of this contract, the Texas Center for Educational Technology will create curricula specifically designed to train Texas educators both on the use of the proposed system functions and on the integration of telecomputing technology into their ongoing instructional delivery. Software for the network will be acquired through competitive bids, from the public domain or through acquisition of specific site licenses for software licensed to state universities. System installation is expected to be complete in August 1991, with districts joining the network over the course of the 1991-92 school year.

While appropriated funding levels did not support acquisition of equipment for the districts, the proposed interagency contracts will enable the agency both to provide unlimited access to the network to all districts and to provide training for up to four Master Trainers per district and Regional Educational Service Center. Provision of both unlimited access to the network and training for district and ESC trainers will significantly encourage usage of the network by all administrators and teachers and will enable student usage where appropriate to instructional objectives. The only cost to the district to access and use network services will be those associated with acquiring a personal computer, a modem and, where a district does not have an existing telephone line or equipment available, a telephone line and instrument.

The agency has requested funding to continue the operation of the Electronic Information Transfer System in the Legislative Appropriations Request for Fiscal Years 1992-93. The requested funding also includes monies to substantially increase administrative and instructional programming for the network. Such funding will support development of programs such as transfer of accreditation data and teacher records and creation of an on-line Software Reference Guide for delivery on the network as well as acquisition of state licenses for programs such as National Geographic KidsNet.

3. Instructional Television Allotment

State funds were not appropriated for an instructional television allotment. Other available funds were used for this purpose, as previously described in the discussion in Section III.A.3.

4. Integrated Telecommunications System

Proposed Action:

The plan envisioned expansion of telecommunications systems supporting delivery of distance education and other information transfer services by expanding the capabilities of public broadcasting and other existing delivery systems. The system expansion was designed to provide the majority of districts with the facilities necessary for reception and exchange of coursework for credit, supplemental instruction, inservice, technical assistance, parent and community education, and other information services.

Accomplishments:

Senate Bill 650, passed during the Regular Session of the 71st Legislature, included a provision, now codified as Section 14.043 of the Texas

Education Code, which authorized expansion of telecommunications services for the public school system. Analyses completed during an engineering feasibility study resulted in a recommended five year plan for implementing the Integrated Telecommunications System (ITS). This plan was adopted by the board in February 1991. The total appropriation for Senate Bill 650 supported an allocation of $2.5 million, rather than the requested amount of $5.921 million, for the initial implementation of the Integrated Telecommunications System; this allocation supports only a very limited Phase I implementation.

The agency is now in the process of implementing the activities recommended for Phase I of the Integrated Telecommunications System five year plan. This program will provide schools in approximately 180 districts with comprehensive access to a broad range of telecommunications services that enable delivery of curricula and inservice training, technical assistance, instructional software, and other text and graphics applications. The ITS system will be primarily satellite-based and will support audio, video, and digitized communications services among and between the entities of the public education system in Texas.

In May 1990, the agency entered into a contract with CyberLink Corporation, a telecommunications engineering firm, for a study of the public school system telecommunications environment. The reports prepared by CyberLink explored existing and planned networks in Texas and in selected other states and made a series of recommendations regarding the telecommunications delivery configurations most appropriate for linking together all Texas school districts, considering the desired services and the geographic and demographic character of the state. Reports addressed the integrated telecommunications concept, applications and services, transmission requirements, needed school equipment, system design and implementation costs. Also included was a study of the feasibility of electronic publishing as a future application on a telecommunications network.

CyberLink recommended a five year master plan for the implementation of the Integrated Telecommunications System. This plan, adopted by the State Board of Education in February 1991, envisions a satellite-based system for delivery of video and data services to the district level, augmented and expanded through terrestrial and other transmission media within regions and school districts. Over a five year period the plan calls for approximately 900 receive-only satellite dishes and 700 digital send-and-receive satellite dishes to be installed in school districts to provide access to both public and private information and broadcast networks. Equipment, installation and training will be provided to approximately 180 districts under Phase I of the ITS program. Necessary amounts of satellite services such as transponder and earth station uplink time for transmission of state and school information exchanges, as well as lease of hub facilities including network-management, will also be acquired in Phase I.

In February 1991, the State Board of Education authorized the Commissioner of Education to enter into contracts for the necessary equipment and services to complete Phase I implementation of the system, which will award about 120 receive-only satellite dishes and 64 digital send-and-receive satellite dishes to districts that meet the application criteria,

which by law include a bias to school districts with limited financial resources. The equipment and services will be acquired through competitive bid processes during the spring and summer of 1991, with installations beginning in late summer and continuing through the fall of 1991. Assuming continued appropriations, the system will be fully implemented by 1996.

Other recommendations from the CyberLink reports addressed the need for acquisition and development of telecommunications services, to include video programming created by the agency for inservice and technical assistance as well as applications provided by schools, Regional Education Service Centers, public broadcasters and universities. CyberLink recommended that video program development be encouraged through several means, including grants to qualified producers.

Funding to continue implementation of this system has been included in the agency's Legislative Appropriations Request for Fiscal Years 1992-93. The requested funding will enable the agency to expand the number of districts given equipment to access the ITS system capabilities, which include access to a wide range of distance education services. However, the requested funding also includes substantial funds for a significant increase in the administrative and instructional programming available on the network. Funds will be provided to develop or acquire applications such as distance education services, administrative and staff training, administrative support services, media ordering and delivery, inter-library loan support, and information exchange in support of both existing agency systems such as PEIMS and future agency systems such as accreditation and compliance monitoring.

5. Standards

Proposed Action:

The plan addressed the need for standards governing various aspects of the Electronic Information Transfer System and the Integrated Telecommunications System, such as equipment specifications and quality of application products, in order to ensure that the objectives of those systems were met.

Accomplishments:

In the case of the Electronic Information Transfer System and the Integrated Telecommunications System, de facto standards for equipment will be established by the agency through the results of competitive acquisition processes for those systems. These de facto standards will be recommended to the board for adoption by the Advisory Committee on Technology Standards. These standards will be augmented as necessary by the work of the Advisory Committee on Technology Standards and the Software Advisory Committee as they develop standards to address other issues such as the quality of application products.

Other standards exist and will continue to be developed in the area of distance education. For example, standards already exist to assure that the quality of distance education programming is consistent with the high

standards associated with instruction delivered via direct means. The Texas Education Agency document Guide to Distance Learning as an Alternative Delivery Procedure addresses this quality assurance issue. To offer courses for credit, providers of distance education services must be approved by the agency and must follow the standards detailed in this publication.

6. State Licensing and Delivery of Software

The proposed action and accomplishments to date were addressed in the discussion of State Licenses and Electronic Delivery in Section III.B.7 of this progress report.

7. Collaboration

Proposed Action:

The plan recognized the importance of collaborating with other state and national efforts to leverage the investment being recommended for Texas public education telecommunications networks.

Accomplishments:

The Office for Technology is collaborating with the National Science Foundation, EDUCOM, and several other states to cooperatively develop an educational telecomputing infrastructure which will support the unique needs of the public school system. These activities include investigation of membership in a consortium of state and nonprofit entities to implement educational telecomputing applications such as online directories, user-friendly software, access to curriculum resources and libraries, and other programs designed for teachers and students.

The agency's adopted strategy of using THEnet in the implementation of the Electronic Information Transfer System is a concrete example of collaboration in the use of existing state and national resources. Another example of collaborative effort is the agency's decision to join the States' Consortium for the Improvement of Software Selection, which is involved in the ongoing process of evaluating software for classroom use and of identifying the best of that software for ready access by teachers in member states.

8. Delivery of Training via Distance Education Technology

The proposed action and accomplishments to date were addressed in two previous discussions in Section III.A.3 and Section III.C.9.

E. Research and Development

The original plan recognized that advances in technology are certain but that the infusion of such advanced technologies into the educational process was not. The rapid deployment of innovative technologies into the schools was seen as essential to creating and maintaining a technology-based educational system that did not risk obsolescence of its participants and its graduates. Development of prototype products reflecting the results of research into effective use of technology in the

instructional process was seen to be essential to such a rapid transfer of new technology to the educational process. Research was also seen as an essential component of effective change over time so that future decisions in the implementation of the *Long-Range Plan for Technology* could be based upon technologies and methodologies of proven effectiveness.

Five actions were proposed in the original plan to ensure that appropriate research and development activities took place during Phase I of the plan:

- Establish a Center for Educational Technology.
- Establish multiple demonstration programs of varying duration and disseminate results as appropriate.
- Review district and campus plans for technology during accreditation visits.
- Survey districts annually regarding installed base of technology and plans to expand that base.
- Report progress on the implementation of the *Long-Range Plan for Technology*, with particular attention to the equity of distribution and the effect of technology upon achievement and efficiency.

Each of these actions is addressed in the following sections of this progress report in some detail; where appropriate, discussion of certain items has been combined.

1. The Center for Educational Technology

Proposed Action:

The plan proposed establishing a Center for Educational Technology to conduct research on the use and effectiveness of technology in the educational process.

Accomplishments:

Senate Bill 650 authorized the creation of a Center for Educational Technology and an appropriation in the amount of $800,000 in state funds was made to establish and support initial operation of the Texas Center for Educational Technology (TCET). The provisions of Senate Bill 650 related to the Center were codified in Section 14.044 of the Texas Education Code. The creation of a such a center is an innovative approach to the problems of customizing technologies for effective classroom use and of shortening the time necessary to move appropriate technology from the research laboratory to the classroom.

The site for the Center was awarded to the University of North Texas (UNT) in Denton, with The University of Texas (UT) at Austin participating as a second-site collaborator, through a competitive request for proposal process conducted during the spring of 1990. The State Board of Education authorized the award of the contract to the University of North Texas at the June 1990 board meeting and the Center began operation on June 20, 1990.

The activities of the Center include research and development in the use of technology in education, in the application of new technology to educational settings, in the creation of prototypes for the educational use of technology originally developed for commercial or other purposes, and in the use of various technologies to support handicapped students and teachers. The TCET has established eleven research and development labs directed by faculty at UNT and UT Austin that will positively affect technology-based learning and teaching in Texas. The major categories of research being studied are teacher productivity, student learning, and learning strategies.

A number of Center activities are directed at involving the public education community in the Center and in recognizing and supporting the effective use of technology in the classroom. Some examples of these activities are described below.

- *Technology Excellence Contest*:

  This annual contest will identify and reward Texas teachers who use technology in the best and most effective ways in delivering classroom instruction.

- *Training and Staff Development*

  Summer Institutes and Summer Workshops will be conducted in 1991 as noted in Section III.C.6.

- *Student / Faculty / Guest Lecturer Series*

  A series of lectures will provide information on state-of-the-art technology as well as the results of research projects conducted by the Center. These lectures will be delivered by members of the research teams and by well known authors, researchers, and lecturers.

- *Dissemination*

  A major focus of Center activities will address wide dissemination of information gathered as a result of Center research. Dissemination efforts will include publication of newsletters, research reports and videotapes of lectures and seminars, including the Summer Institutes and workshops, as well as presentations to conferences and districts as appropriate.

Plans to expand the consortium to other universities are presently underway in order to broaden the research and partnership opportunities available to the Center, to make the Center more representative of the higher education community in Texas, and to make the Center more available to educators in the public school system. A meeting hosted by existing members of the Center consortium was held on March 23, 1991 with representatives of universities interested in becoming members of the Center consortium. Plans and strategies were discussed to address issues such as: how to add members to the Center; the responsibilities and privileges of new members; how to conduct research at multiple sites; and, how facility and staff resources might be shared. Baylor University, Texas Woman's

University, Concordia College, The University of Houston at Clear Lake, Texas Wesleyan University, Lamar University, Southwestern University, and Pan American University attended this meeting.

The membership structure for the next year has been designed; rules to implement this structure were adopted by the State Board of Education in March 1991. The membership structure was designed to encourage participation in the Center by creating multiple levels of membership, requiring contributions ranging from $25 for Individual Memberships to $100,000 and over for Sustaining Memberships. Each of the categories of membership is associated with a differing set of benefits, appropriately related to the differing levels of contribution associated with each category.

Rules which establish a governance structure for the Center were also adopted by the State Board of Education in March 1991. The rules create a governance structure in which members of the governing board not specifically named in the legislation will be drawn directly from the membership. The rules address how representatives of each membership category will be selected. The rules were designed to relate the level of involvement in governance of the Center to the level of active support of the Center's activities, as well as to encourage private business involvement in the Center. This governing board will set policy, prioritize research, and establish planning objectives for the Center over the next several years.

Significant interest in the Center in both the corporate and educational communities has emerged; such interest continues to grow as the Center becomes more active. Corporate partnerships with the Center have been established in areas such as telecommunications, satellite distance education, integrated learning systems, and videodisc technology. Contracts with school districts have been established to provide services and technical assistance.

At the present time, the Center has entered into contracts totalling approximately $400,000 for services to be performed by the Center. Fifty percent of those contracted services are to be performed for the agency in support of activities such as designing training curricula for implementation of the Electronic Information Transfer System. Twenty-five percent of the contracted services are to be performed for private industry and twenty-five percent are to be performed for educational entities, including several Texas school districts.

Even more encouraging, private contributions to the Center in the amount of $358,400 have already been received by the Center. These contributions have generally taken the form of donations of either hardware or software to support Center operations or research.

However, the ability of the Center to attract sufficient corporate resources to become self-supporting over the long-term is unknown. The experience of other such entities suggests that continued existence of the Center will require continued availability of state funding to support minimum Center operations. The agency has requested funding for state support of the Center in the Legislative Appropriations Request for Fiscal Years 1992-93.

2. Technology Demonstration Programs

Proposed Action:

The Plan called for the establishment of multiple demonstration programs of varying duration and dissemination of results as appropriate.

Accomplishments:

In 1989, the 71st Legislature authorized the creation of Demonstration Programs in Senate Bill 650, later codified as Section 14.045 of the Texas Education Code. Appropriated funds for Senate Bill 650 supported an allocation of $600,000 for the Demonstration Programs. These technology demonstration programs were established to examine the application and use of technology-based or technology-enhanced instructional delivery systems in different content areas and at different grade levels. The available funds were distributed to districts on the basis of competitive applications submitted by districts; these applications described the proposed project itself as well as the outcomes each district expected as a result of the project. Sixty-one applications were submitted. The evaluation process resulted in the funding of 8 demonstration projects to districts across the state; those awards were made in January 1990.

The funded projects vary widely and include the application of technology to student learning, instructional delivery, and classroom management. A broad range of participants and locations are also represented in these demonstration programs; students, teachers, and parents all participate in these programs which are located on early childhood, elementary, middle, and high school campuses. Student participants range from prekindergarten students to graduating seniors. Those districts which were awarded a demonstration program, and the key descriptors of their program, are listed below.

- Harlingen ISD, Harlingen
  Math / Take Home Computers / Telecomputing

- Hurst-Euless-Bedford ISD, Bedford
  Teacher Productivity / Empowerment

- McAllen ISD, McAllen
  Reading / Higher Order Thinking Skills / Take Home Computers

- Mesquite ISD, Mesquite
  Science / Math / Logo / Writing / Robotics

- Pottsboro ISD, Pottsboro
  Take Home Computers / Telecomputing

- Somerset ISD, Somerset
  Restructured Elementary Day / Differentiated Staffing / At-Risk Students

- Temple ISD, Temple
  Science / At-Risk Students

- West ISD, West
  Writing / Telecomputing / At-Risk Students

The first year outcome evaluation data from these demonstration program sites was published in January 1991. These data, although sparse because of the limited amount of time the demonstration programs have been operational, suggest that students involved in the technology demonstration pilots had much to gain academically from any improvement brought about by the incorporation of technology into their education. If pilot staff perceptions of increased student attendance, interest, and productivity associated with the new technology remain valid in the longer term, improvement in the academic performance of participating students should become evident as the demonstration programs mature to full implementation.

3. Review District and Campus Plans

Proposed Action:

The plan called for the review of district and campus technology plans during accreditation visits.

Accomplishments:

In September 1988, the agency began conducting training on a model planning process for the creation of district and campus level technology plans to assist the districts in preparation of quality technology plans. These plans were to be in place by September 1989. The training was provided to both ESC and district staff using a train-the-trainers model, as noted in Section III.C.3.

District and campus technology plans, and the implementation of those plans, are now being reviewed during accreditation visits. Improvements in the review of those plans will be achieved through use of a common assessment instrument, compatible with accreditation reporting procedures, that is currently under development to assist the accreditation teams. Demonstrations of the latest technology, and a description of indicators to observe in the schools, have also been given to accreditation staff to facilitate their review process.

As noted in Section III.A.1, Senate Bill 1 requires districts to submit five-year technology plans to the agency and to the Department of Information Resources in order to qualify for an allotment from the Technology Fund. The agency intends to implement this provision of law, codified in Section 14.065 of the Texas Education Code, through rules governing submission of plans, applications for technology allotments and required annual reports. These rules are presently under development by the Advisory Committee on Technology Standards and, as noted in Section III.A.5, will be recommended to the board in June 1991. Agency staff will review the submitted plans and applications for an allotment as they are received. Funding to support the staff necessary to conduct such reviews was included in the agency's Legislative Appropriations Request for Fiscal Years 1992-93.

4. Survey Districts

Proposed Action:

The plan suggested that an annual survey be conducted regarding the installed base of technology and district plans to expand that base.

Accomplishments:

Two surveys have been made of districts installed base of technology: the first was a comprehensive inventory conducted in conjunction with the Facilities Inventory mandated in Senate Bill 1; the second was a survey conducted by the Office for Technology in December 1990 which sought to ascertain a limited amount of information regarding the administrative and instructional bases of technology in the schools.

The Facilities Inventory is not yet complete. The inventory is being conducted by the 3D/I Corporation and includes a full inventory of the physical plant at all school sites as well as a technology inventory that addresses the various technologies in use in the schools such as robotics, computers, videotape, videodisc and telecommunications facilities. The technology component of the inventory was prepared collaboratively with staff in the Office for Technology.

At the end of the contract, the agency will have a complete database of a point-in-time assessment of both physical plant and technology systems in use in the public school system. The technology systems data will be used as a baseline for comparative analysis in the future. It will also be used as a source from which a financing plan for technology, which would support movement toward a common level of the use of modern technology systems across the multiple districts in the state, can be derived.

The voluntary-response survey conducted by the agency's Office for Technology was significantly more limited in scope, seeking to address specific areas of interest related to the districts' implementation of the *Long-Range Plan for Technology*. In this survey, district experience from the 1989-90 and 1990-91 school years was compared in the areas of overall budget, specific item expenditures, planning, and sources of both training and technical assistance. Comparisons in each of these subject areas were made for both instructional and administrative settings. The major findings from this survey are discussed below. The findings are based upon information provided by the 586 districts which responded to the survey; all percentages are rounded.

Overall District Budgets	3.5% allocated to technology
	2% allocated to instructional technology in 1989-90; a slight increase noted in 1990-91
	1.5% allocated to administrative technology in 1989-90; a slight decrease noted in 1990-91

Item Expenditures - Instructional	Over 50% in 1989-90 allocated to stand-alone systems and integrated learning systems 25% allocated to stand-alone workstations; a slight decrease noted in 1990-91 16% allocated to integrated learning systems; a slight increased noted in 1990-91 16% allocated to networks in both school years
Item Expenditures - Administrative	47% allocated to standalone workstations in 1989-90; a slight increase noted in 1990-91 28% allocated to mainframe computers in 1989-90; a slight decrease noted in 1990-91
ig	90% report having technology plans Four areas most often reported NOT included in those technology plans are: • staffing and personnel • staff development strategies • evaluation strategies • overall expenditures
Sources of Training and Technical Assistance	22% of training and technical assistance provided by Regional Education Service Centers 21% of training and technical assistance provided by in-district resources

5. Progress Report

Proposed Action:

The plan proposed that regular progress reports be made on the implementation of the *Long-Range Plan for Technology*, with particular emphases on the equity of distribution and the effect of technology upon achievement and efficiency.

Accomplishments:

This document is the first such progress report; this document details the accomplishments made in the twenty-eight months since the passage of the *Long-Range Plan for Technology*. Much has been achieved during that period. As noted earlier, two significant pieces of statute were created by

the legislature which translated major components of the plan into state policy, backed by significant appropriations of public funds. These two pieces of legislation, Senate Bill 650, effective in September 1989 and Senate Bill 1, effective in September 1990 (later amended by Senate Bill 351 in April 1991), will influence and guide the progress of all public school entities in moving toward the goals expressed in the *Long-Range Plan for Technology*.

This report has concentrated on state-level activities accomplished by the agency during the nineteen months since the passage of Senate Bill 650. In that short period of time, much has been accomplished by the agency in collaboration with many other entities. This document is proof of that fact. The legislature has also extended its commitment to the use of technology in the schools during that period as demonstrated by its passage of both Senate Bill 1 and Senate Bill 351.

However, much yet remains to be done. While it is too soon to assess the impact that this plan has had upon either equity of access, or student achievement, the progress made thus far has certainly fashioned an effective base from which to excel in both areas in the future.

IV. The Need for Continued Action

While significant progress has been made toward accomplishing the state goals for Phase I of the *Long-Range Plan for Technology*, much work still remains to be done at all levels. The information below is intended to provide the backdrop for consideration of the agency's further requests for funding technology programs for the public school system in Texas as expressed in the Legislative Appropriations Request for 1992-1993.

It is important to note that a centerpiece for moving the state toward accomplishing the goals expressed by the State Board of Education in the *Long-Range Plan for Technology* is the creation of statewide infrastructures such as the Integrated Telecommunications System and the Electronic Information Transfer System. Creation of the Texas Center for Educational Technology is an additional, significant step toward building the infrastructure necessary to accomplish the goals of the plan. Yet another essential ingredient for progress is the creation, and appropriation, of the technology allotment in Tier 1 of the Foundation School Program.

It is the creation of these infrastructures and the provision of funds for districts to implement district and campus level decisions which will enable the targets expressed in the *Long-Range Plan for Technology* to be achieved. These targets are of two levels. On one level they are specific, such as the number of hours each student should have access to a computer each week. On another level they are broad, such as the ability of every student to have access to all courses required for graduation. Both levels were determined to be essential to meeting the educational objectives expressed elsewhere by the State Board of Education, both in the *Long-Range Plan for Public Education* and in the *Long-Range Plan for Technology*.

The need for infrastructure systems is critical. Analysis of Public Education Information Management System data show that there are hundreds of school districts in the state that had no enrollment in courses required for the advanced diploma that currently are offered in Texas via distance education. The courses are U.S. Government, Foreign Languages I and II, Health Education, Physics I, Economics, Trigonometry, World Geography, and Elementary Analysis. The following table illustrates the extent of the problem. The table illustrates the fact that 270 districts did not show enrollment in one of the courses currently available through distance education; 6 districts did not offer 8 such courses.

Table 2

Number of Courses Not Offered by Texas Districts
Which Are Presently Available through Distance Education Services

Number of Courses	Number of Districts
1	270
2	306
3	145
4	37
5	13
6	2
7	1
8	6

Continued funding of the Integrated Telecommunications System, which will provide the necessary equipment and services to access needed distance education services, and appropriations for the Technology Fund, which can support district acquisition of such distance education programming, is thus essential to address a known area of significant inequity in the State.

Continued funding for the operation of the Electronic Information Transfer System is also essential. The districts responding to the survey discussed in Section III.E.4 of this progress report indicate that almost 50% of the districts do not use the electronic communications capabilities of the agency's TEA-NET network to send information to and receive information from the agency. Data kept by the agency validate the survey data; these data indicate that on the average only about 300 school districts access the TEA-NET system on a monthly basis. One of the most likely causes for such a low level of participation is the prohibitive cost of the telecommunications access time. The funding requests to operate the new Electronic Information Transfer System being implemented by the agency will provide virtually unlimited access time to the districts at no cost to the districts and thus should overcome the most significant obstacle to district participation. Original agency estimates indicated that over $2 million in annual postage savings could accrue to the agency when the system is fully implemented.

Appropriation of the Technology Fund will enable the districts to make progress in two other significant areas: increased access to technology as measured by the ratio of students/teachers/administrators to computers; and, training in the use of technology-based systems. While districts have made significant investments in technology and are moving closer, and often beyond, the target ratios established in the plan, the evolution of technology has probably already made those ratios obsolete. For example, the ratio of students to computers expressed in the plan is 23:1, which was estimated would provide each student access to the computer 1.3 hours per week. The kinds of technology systems now available, such as integrated learning systems, require substantially more access than the target of 1.3 hours per week to produce significant gains in student achievement. Thus, the accomplishments of districts who responded to the survey, which showed impressive ratios of 19.5:1 at the elementary level and 12.8 at the secondary level, in all likelihood represents progress toward, but not achievement of, the goals expressed in the plan.

Analysis of this data is also complicated by the fact that much of the technology in place in the schools is older technology and therefore does not have the capabilities necessary to support sophisticated courseware or integrated learning systems. Such sophisticated systems are necessary to support a change from using technology for drill-and-practice to using technology for problem solving and for exercising critical thinking skills. The data which will be available as a result of the Facilities Inventory will enable a far more accurate analysis of the age and functionality available in the present technology base in place in the schools. National data also support the fact that significant investments are still needed in technology systems within the Texas public school system: preliminary 1990-91 data indicate that Texas ranks 23rd in the nation in the density of computers per student population.

Funding for continued support of the Texas Center for Educational Technology is also essential. Research in the educational effectiveness of various new and existing technologies is essential to the continued improvements in the public school system that can be derived from successful integration of technology into the instructional process. Improvements in the time needed to transfer technologies in use in the private sector and the development of technologies designed or adapted specifically for use in the public education system are also essential. For example, it can often take as long as fifteen years

for technologies in use in industry to achieve widespread use in the public school system; this transfer time must be shortened.

The need for training of teachers and administrators was recognized in the *Long-Range Plan for Technology* and by the legislature through various provisions of both Senate Bill 1 and Senate Bill 351 which require that district plans address inservice training and staff development in the use of technology and that preservice programs include such training as well. Progress is being made in this area as well. Over 90% of the districts responding to the survey reported an increase in the number of trained teachers between the 1989-90 and 1990-91 school years. However, the percentage of trained teachers is still relatively low: districts reported that only 58% of elementary school teachers and 51% of secondary school teachers have been trained in the use of technology even when the districts were themselves able to define the term "trained in the appropriate use of technology." In addition, those districts responding to the survey indicated that over 70% of those districts do not address staff development strategies in their district and campus level technology plans.

The need to increase the level of support for technology in the Regional Education Service Centers is essential. The high demand for those services and the fact that the level of technology support is not evenly distributed across the state, due to differences in programs that are able to be supported by the various ESCs, must be addressed through funding mechanisms such as Technology Preview Centers. For example, the number of staff supporting instructional technology varies among the ESCs from a low of 0 to a high of 2 full-time equivalent staff. The technology systems available to support training and/or preview of software and courseware also ranges widely, from a low of no equipment to a high of 37 personal computers. While some ESCs are not able to provide much support, the overall level of support that is available is generally high considering the fact that funding is not provided to the ESCs for these purposes.

The importance of continued investment in public education and in the use of technology systems to achieve critical educational objectives is widely recognized. Texas must move from its 47th place ranking in adult literacy and must reduce its high school dropout rate from 33%, which places Texas in 42nd place in graduation rate in the nation. Achieving the goals and objectives expressed in the two plans of the State Board of Education, the *Long-Range Plan for Public School Education* and the *Long-Range Plan for Technology*, will certainly result in moving Texas from the lowest levels of achievement in the nation to the highest. Continued state funding of technology in education is an essential and a critical requirement to achieve that progress.

V. Requests to the 72nd Texas Legislature

Throughout this progress report on the *Long-Range Plan for Technology*, reference has been made to funding requests made in the agency's Legislative Appropriations Requests for Fiscal Years 1992-93 to continue the progress toward the goals of the plan and the fulfillment of legislative mandates expressed in Senate Bill 650 and Senate Bill 1. To clarify those scattered discussions, a summary of the agency's Level 4 Legislative Appropriations Request for technology-based systems is provided below.

A. Electronic Information Transfer System

The Electronic Information Transfer System is a statewide electronic information transfer system to exchange electronic mail within and among districts, Regional Education Service Centers, and the agency and to deliver technical assistance and supplementary instruction to districts and campuses.

Level 4 Request - $4.5 Million per fiscal year:

The statewide Electronic Information Transfer System will allow all public school system entities and all state agencies to share information among and between themselves using the capabilities of the system to: create and deliver electronic mail; establish and share electronic bulletin boards and conferences; deliver technical assistance and supplementary instruction; access information extracts from databases such as PEIMS; access information databases developed by the agency, such as the Software Preview Guide, the Texas School Directory, and Accreditation Information; and, develop and implement curriculum-related projects for campuses and students.

At Level 4, the program will be fully implemented in all districts and unlimited access to network services will be provided. In addition, training will be provided to four staff from each district and ESC as Master Trainers in the operation and in the maintenance of the basic system, as well as on special services, at no cost to the district. This level of funding also supports an aggressive program of development and acquisition of network services such as creation of PEIMs extracts and accreditation databases. This level of funding also supports development of additional course curricula as new products and services are developed for delivery on the system.

B. Integrated Telecommunications System

The Integrated Telecommunications System is a statewide, integrated telecommunications system linking, primarily via satellite, the agency, the districts, and the Regional Education Service Centers for the purposes of distance education, conferencing, inservice and technical assistance.

Level 4 Request - $8 Million per fiscal year:

Implementation of the integrated audio/video/information telecommunications system will be extended through continued acquisitions in support of required facilities in both the districts and Regional Education Service Centers as well as at the agency. The system will be used to deliver inservice, technical assistance and distance instruction products acquired or developed to meet needs defined by the

districts, the ESCs, and the agency. Approximately half of the funds will be spent for acquisition of products for delivery through the system.

At Level 4 funding, implementation of the Integrated Telecommunications System, which will be started in FY 91 with the provision to connect to a satellite uplink facility, and with installation of approximately 64 digital send-and-receive satellite dishes for data communications and 121 receive-only for one-way video and two-way audio communication, will be significantly expanded with the installation of an additional 300 digital send-and-receive satellite dishes and 300 receive-only satellite dishes. Training in the operation of the satellite dishes and associated control equipment will be provided to each district at the time of equipment installation. The lease of necessary uplink and hub facilities, as well as satellite transponder time, will be available to support delivery of up to six hours of information, inservice, staff development, and technical assistance services from the agency to participating districts. As noted above, this level of funding also supports an aggressive program of acquisition and development of video and data services for delivery on the network.

C. Texas Center for Educational Technology

The Texas Center for Educational Technology is a research and development consortium of hardware, software, textbook, testing, and other companies, the public school districts, institutions of higher education, the agency, and interested individuals whose purpose is to promote and test innovative applications of existing and emerging technologies in the public school system.

Level 1 Request - $400,000 per year:

Funds to support continued operation of the Texas Center for Educational Technology for the remainder of its first three years of its existence were requested at Level 1.

At Level 1 funding, the Center for Educational Technology, a consortium of the University of North Texas and The University of Texas at Austin, will continue to conduct research and development projects in the application of existing and newly created technologies to the education process. The Center will continue to enter into partnerships with both corporate and educational entities, public school districts and institutions for higher education. The Center will involve educators in Center activities through many innovative programs, including stipends for inservice training and sabbaticals. The Center will also distribute information and products acquired and developed through research projects through a wide variety of dissemination techniques.

D. Standards and Purchasing Mechanisms

Standards and Purchasing Mechanisms includes the adoption of standards for hardware, software, courseware, training and staff development, and other technology products, as well as for services and mechanisms to support district purchases of technology products and services.

Level 4 Request - $491,500 per fiscal year:

Two statewide committees, the Software Advisory Committee and the Advisory Committee on Technology Standards, will continue to meet at least 4 times annually to develop standards for the selection of hardware, software, courseware and services for use in school districts. Exemplary software products which meet the standards will continue to be recommended for district use. A separate and new committee, the Standard Contracts Committee, will be convened to work with the State Purchasing and General Services Commission and with partially funded staff in the Regional Education Service Centers to develop group purchase contracts for use by districts to purchase hardware, software, courseware and services which meet standards adopted by the board or which have been recommended for adoption by the Software Advisory Committee.

Guidelines and instructions will be created for the development of district technology plans as required by Senate Bill 1. Inservice training materials will also be developed to assist district staff in developing individual district plans. When the plans are submitted, staff will analyze and evaluate the plans and prepare remedial training material for delivery to districts, as appropriate and required. A statewide summary assessment of the submitted plans will also be developed.

At Level 4, all committee travel will be supported and the committees can continue to perform their assigned responsibilities. In addition, each Regional Education Service Center will receive funding to support a half-time staff position to participate and assist in developing and operating group purchase contracts.

E. Technology Preview Centers

Technology Preview Centers are to be located at Regional Education Service Centers and include equipment, software and courseware, and funded staff to provide inservice and technical assistance to districts on technology products, services and plans.

Level 4 Request - $2.6 Million per fiscal year:

Technology Preview Centers will be established at each Regional Education Service Center to demonstrate effective uses of technology and to provide inservice and technical assistance to districts in the implementation and effective use of technology for both administrative and instructional purposes. The preview centers will be used to showcase and demonstrate, and to allow district personnel hands-on experience with, exemplary instructional systems as well as hardware and other software, courseware and services. The centers will be staffed to provide continual assistance to districts in planning for the effective use and integration of technology into their daily operations.

At Level 4, the preview centers will be staffed with two full-time staff per ESC; these staff will provide technical assistance in technology systems and should serve as effective resources for the districts as they develop and acquire equipment and software to implement their district five-year technology plan. At this level of funding, matching funds will be provided to each preview center for the acquisition of equipment and software and an ambitious program of summer institutes, designed to increase the level of technology expertise in the districts, will be developed for Texas educators.

VI. Conclusions

The vision and principles articulated by the State Board of Education in the *Long-Range Plan for Technology* are now commonly shared within the public education system in Texas and remain the standard against which progress in achieving the goals of the plan will be judged. The goals expressed by the board have been validated by both time and experience: the goals are viable and much progress has been made toward their achievement.

The partnerships formed to create the original plan have been maintained and extended within the business, education, agency and legislative communities. The significant achievements documented in this progress report have been accomplished through the cooperative efforts of the board, the legislature, districts, Regional Education Service Centers, and the business community. These cooperative efforts have been augmented by the work of many individuals in the public school system who are providing technology leadership not only to their schools but also in many cases to the state and to the nation. Students in Texas schools now participate in classrooms of tomorrow, learn Japanese by distance education and telecommunicate with students in Australia; students have access to integrated learning systems, videodisc "textbooks", robotics laboratories and supercomputing facilities. Such achievements represent the best that technology has to offer public education.

Although such achievements are significant, they are not representative of the common level of achievement in the use of technology in education. The issue of equity of access still exists. However, the means for moving toward such equity have been created. The provisions of Senate Bill 650, Senate Bill 1 and Senate Bill 351 have clearly established the basic infrastructures necessary to move the entire public school system toward excellence in the use of technology: the authorization and initial appropriations for the Texas Center for Educational Technology, the Electronic Information Transfer System and the Integrated Telecommunications System establish a strong infrastructure for moving the system toward both excellence and equity of access. The creation of the Technology Fund will, when appropriated, enable complementary implementation of instructional and administrative technology systems which meet specific local needs.

The *Long-Range Plan for Technology* expressed a belief in the value of partnerships, in the need for research in educational technology, in the need for state investment in communications infrastructures, in the importance of training, in the necessity of local decision-making and, perhaps most significant, in the assumption that the use of technology in the public school system is an essential ingredient in the creation of well-educated individuals and a competitive workforce. The adoption of the plan itself and the subsequent actions taken to achieve its goals have placed Texas in a leadership role in the nation. Other states look to Texas: educators and educational entities across the nation continue to ask for copies of the plan and continue to seek advice from Texas on issues in educational technology as diverse as electronic textbook adoption, state-level technology funding, telecommunications infrastructures and forming effective partnerships between business and education. The level of leadership demonstrated by this state, and the level of national interest in what is done in Texas, are illustrated by the bibliography shown on the next page. This bibiliography represents a partial list of articles written about both the creation of the *Long-Range Plan for Technology* and the more recent adoption of *Windows on Science* as a textbook for elementary science.

Much has been done; much yet remains to be done. The vision expressed in the *Long-Range Plan for Technology* is possible and is being achieved. The commitments expressed in the past must continue. Significant legislative appropriations, vigorous action by the agency and local school districts, and continued leadership of the board are all essential to further progress.

Let us continue the work that has begun.

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COMPLIANCE STATEMENT

TITLE VI, CIVIL RIGHTS ACT OF 1964; THE MODIFIED COURT ORDER, CIVIL ACTION 5281, FEDERAL DISTRICT COURT, EASTERN DISTRICT OF TEXAS, TYLER DIVISION

Reviews of local education agencies pertaining to compliance with Title VI Civil Rights Act of 1964 and with specific requirements of the Modified Court Order, Civil Action No. 5281, Federal District Court, Eastern District of Texas, Tyler Division are conducted periodically by staff representatives of the Texas Education Agency. These reviews cover at least the following policies and practices:

(1) acceptance policies on student transfers from other school districts;

(2) operation of school bus routes or runs on a non-segregated basis;

(3) nondiscrimination in extracurricular activities and the use of school facilities;

(4) nondiscriminatory practices in the hiring, assigning, promoting, paying, demoting, reassigning, or dismissing of faculty and staff members who work with children;

(5) enrollment and assignment of students without discrimination on the basis of race, color, or national origin;

(6) nondiscriminatory practices relating to the use of a student's first language; and

(7) evidence of published procedures for hearing complaints and grievances.

In addition to conducting reviews, the Texas Education Agency staff representatives check complaints of discrimination made by a citizen or citizens residing in a school district where it is alleged discriminatory practices have occurred or are occurring.

Where a violation of Title VI of the Civil Rights Act is found, the findings are reported to the Office for Civil Rights, U.S. Department of Education.

If there is a direct violation of the Court Order in Civil Action No. 5281 that cannot be cleared through negotiation, the sanctions required by the Court Order are applied.

TITLE VII, CIVIL RIGHTS ACT OF 1964; EXECUTIVE ORDERS 11246 AND 11375; TITLE IX, 1973 EDUCATION AMENDMENTS; REHABILITATION ACT OF 1973 AS AMENDED; 1974 AMENDMENTS TO THE WAGE-HOUR LAW EXPANDING THE AGE DISCRIMINATION IN EMPLOYMENT ACT OF 1967; AND VIETNAM ERA VETERANS READJUSTMENT ASSISTANCE ACT OF 1972 AS AMENDED IN 1974.

It is the policy of the Texas Education Agency to comply fully with the nondiscrimination provisions of all federal and state laws and regulations by assuring that no person shall be excluded from consideration for recruitment, selection, appointment, training, promotion, retention, or any other personnel action, or be denied any benefits or participation in any programs or activities which it operates on the grounds of race, religion, color, national origin, sex, handicap, age, or veteran status (except where age, sex, or handicap constitute a bona fide occupational qualification necessary to proper and efficient administration). The Texas Education Agency makes positive efforts to employ and advance in employment all protected groups.