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                 *Technology Plans; Vision Statements; Washington

ABSTRACT
                 This final report for the Washington State Technology Plan
for K-12 Common Schools provides a vision, long-term framework, and
recommendations for implementation. Following an executive summary and a list
of committee members, the first section of the report discusses technology in
K-12 schools of tomorrow, including legislative charge, vision, essential
learning for technology, and research/reform and exemplary practices.
Technology in K-12 schools of today is discussed in the second section,
including the state of the state, current technology initiatives/status quo,
and challenges and opportunities. The next section outlines best practices
and potential costs for bridging the gaps in the education system that are
preventing schools from providing the learning opportunities necessary for
students to reach the technology vision. The fourth section presents
recommendations with accountability to bridge the gaps in the following
areas: (1) leadership, including technology in education initiatives,
partnerships/alliances and public awareness, affordable telecommunications
access, state policies and funding strategies, and levy and bond regulations;
(2) resources, including state allocations, regional support for educational
professionals, enhancing the K-12 statewide electronic network, and
electronic destinations; and (3) implementation, including integrating
technology into the curriculum and teacher preparation programs, and
information polices. Appendices include authorizing legislation, definitions,
timelines, and highlights of educational technology research. (Contains 40
references.) (AEF)
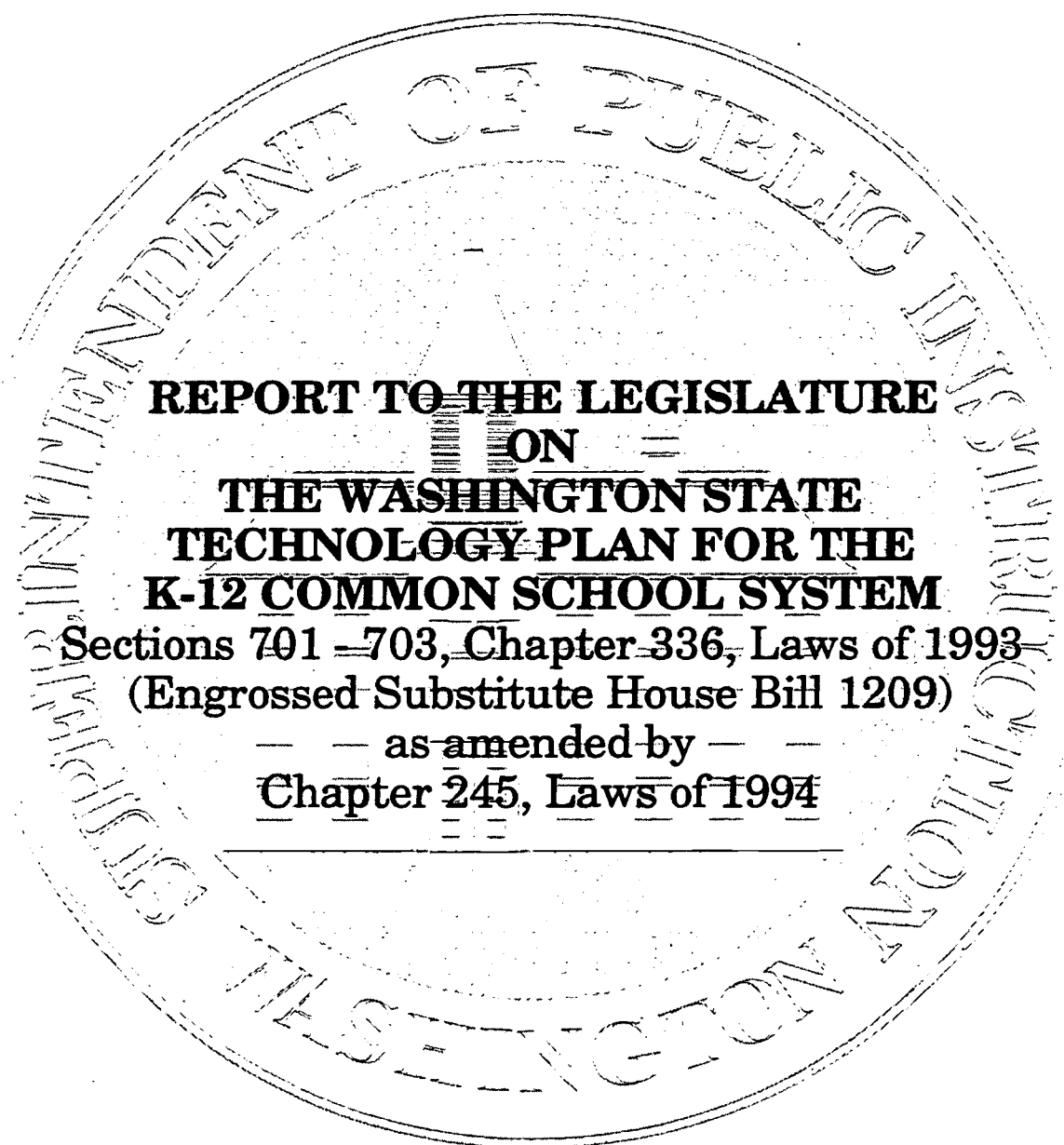
REPORT TO THE LEGISLATURE
ON
THE WASHINGTON STATE
TECHNOLOGY PLAN FOR THE
K-12 COMMON SCHOOL SYSTEM
Sections 701 – 703, Chapter 336, Laws of 1993
(Engrossed Substitute House Bill 1209)
— as amended by —
Chapter 245, Laws of 1994

SEPTEMBER 1994

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Provided by: Dr. Terry Bergeson
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SUPERINTENDENT OF PUBLIC INSTRUCTION

JUDITH A. BILLINGS OLD CAPITOL BUILDING • PO BOX 47200 • OLYMPIA WA 98504-7200

September 1994

TO: Members of the Washington State Legislature

FROM: Judith A. Billings, State Superintendent of Public Instruction

RE: Washington State Technology Plan for K-12 Common Schools

It is my pleasure to present to you the final report for the Washington State Technology Plan for K-12 Common Schools as required by Section 701-703, Chapter 336, Laws of 1993 (RCW 28A.650.015).

With the tremendous economic, political and social impact of technology on our society, it is critical that today's learners be able to skillfully use technology. As the state transitions to a new education system, technology will be key to ensuring that all children are provided with the opportunity to successfully reach the four state learning goals. It is my intent, as a member of the Commission on Student Learning, to ensure that technology is integrated into the new education system of the state.

The development of the Washington State Technology Plan for K-12 Education is one of several statewide technology initiatives launched this biennium. This report represents the consensus of a very diverse Education Technology Advisory Committee, after a year of learning, discussion, analysis and public input. It provides a vision, a long-term framework, succinct recommendations for the 1995-97 biennium and a dynamic process for continuation of the Advisory Committee's planning and oversight of the incremental implementation of the plan.

I trust you will find this technology plan to be a blueprint for the State Legislature in assisting Washington schools to use 21st century tools to serve 21st century students.

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94 WASHINGTON STATE TECHNOLOGY PLAN FOR K-12 COMMON SCHOOLS

Executive Summary

Legislative Charge

The Washington State Legislature, through the 1993 Education Reform Act (ESHB 1209), mandated that a state technology plan for K-12 schools be developed by the Office of Superintendent of Public Instruction (OSPI), with the assistance of a statewide Education Technology Advisory Committee.

The Act shifted the emphasis in K-12 education from inputs (seat time) to four newly defined state learning goals. While there continues to be an emphasis by the state on the academic areas, the threads of critical thinking and problem-solving, communication, lifelong learning, integration of traditional academic and vocational experiences, school-to-work transition and performance-based assessment are woven tightly into the fabric of the reform.

Technology is critical to each of those threads. The Act clearly states, "The Legislature recognizes that up-to-date tools will help students learn" and that "workplace technology requirements will continue to change and students should be knowledgeable in the use of technologies."

Based on that context, the Education Technology Advisory Committee has worked closely with other education reform initiatives. In particular, the Advisory Committee has worked with the Commission on Student Learning to integrate technology into the essential academic learning requirements and with the Center for the Improvement of Student Learning through the statewide data and videoconferencing systems.

> "The Legislature recognizes that up-to-date tools will help students learn... workplace technology requirements will continue to change and students should be knowledgeable in the use of technologies."
>
> *1993 Education Reform Act*

Technology and Education Reform

The state of Washington is at a crossroads with its K-12 school system. In 1993 the State Legislature found that "student achievement in Washington must be improved to keep pace with societal changes, changes in the workplace, and an increasingly competitive international economy." Based on that finding, the 1993 Legislature defined new state learning goals and set in motion the development of essential academic learning requirements, associated standards and a performance-based assessment system.

The success of that effort will, to a great extent, depend on the integration of technology in schools. Technology can assist educators to provide each child and youth an opportunity to learn which is unique to their learning needs and enables them to attain the four state learning goals. At the same time, technology and telecommunications can reach beyond the walls of the classroom to

> *The Education Technology Advisory Committee has worked with the Commission on Student Learning to integrate technology into the essential academic learning requirements.*

bring the relevancy, richness of resources, school-to-work experiences, and connections with peers and experts which provide the kind of education envisioned in the 1993 Education Reform Act. The economic health and growth of the state of Washington depends on the work readiness and skill development of these youth.

Secretary Riley, U.S. Department of Education, testifying before the U.S. Senate Committee on Commerce, Science and Transportation on May 25, 1994, stated, "If we want to create a broad-based, well-educated workforce that has a capacity to use information to keep our economy growing, then we need to hook this future workforce into the NII (National Information Infrastructure) early."

Enhancing learning through technology and ensuring that students have the technology skills required for today's workforce requires more than just the access to equipment, services and networks. It requires learners who know how to ask probing questions; access and analyze sources of information; construct new meaning from the data; and then are able to effectively communicate their ideas to others. It requires educators and communities who use the technology to create enabling learning environments for all students. And it takes communities and policymakers who have the vision and courage to make the right choices for learners of the '90s.

Just as medicine, law, entertainment, agriculture, manufacturing, transportation, communications and service industries have embraced technology in order to remain viable as they forge their way into the 21st century, so must education. In this era of education restructuring, technology and telecommunications are catalysts toward the emergence of a new education system which truly meets this generation's economic, social, health, civic and family needs.

Technology Initiatives
This state technology plan is one of several technology initiatives launched by the Act. The others include the provision of:

* technology support to school districts through the Educational Technology Support Centers in each of the nine educational service districts (ESDs);
* the enhancement of the statewide data network through the establishment of eleven Internet hubs across the state;
* the provision of networking consultants for local schools;
* the establishment of the Washington Interactive Television system for videoconferencing (in partnership with the educational service districts and the Department of Information Services);
* the establishment of prototypes of on-line curriculum projects involving more than 300 classrooms; and
* an allocation of approximately $20.61 per student to districts for "instructional materials and technology related investments."

In addition, the state continues other technology initiatives:
* A U.S. Department of Education grant for $3.9 million to the Pacific Northwest Star Schools Partnership for distance learning;

- instructional television services for K-12 education;
- services through the Special Education Technology Center; and
- many, many creative, innovative initiatives in school districts, school buildings, school classrooms and communities across Washington.

State Framework

The Education Technology Advisory Committee approached this mandate from the legislature by conducting a gap analysis which established a vision for the state; analyzed the current state of educational technology in schools; identified gaps; and established goals and recommendations to bridge the gaps.

The intent of this State Technology Plan for the K-12 common schools is to provide recommendations which establish the state structures, strategies, alliances, funding mechanisms and common vision necessary to realize each student's learning potential, in part, through access and use of technology and telecommunications.

To ensure that all children have access to information and technology for learning, the state must take a leadership role.
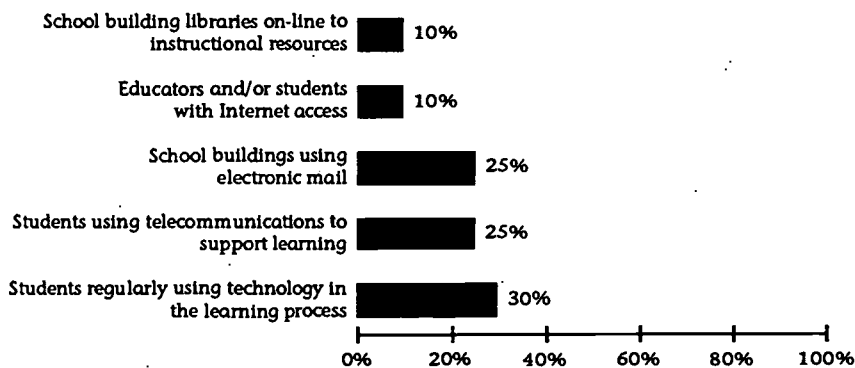
A Snapshot of Technology in Schools

Data on the Fall 1993 Statewide Technology Survey indicates both interest and commitment on the part of school districts to the integration of technology into the learning process:
- 55% of school districts have technology coordinators (most are part-time);
- 50% of school buildings have designated technology resource people (typically this is an added assignment to an already busy classroom teacher); and
- 80% of school districts are developing, implementing or revising a technology plan.

Despite many model projects and many exemplary technology initiatives in school districts across the state, technology has yet to be integrated into the learning process.

Technology and Telecommunications in K-12 Schools

School building libraries on-line to instructional resources — 10%

Educators and/or students with Internet access — 10%

School buildings using electronic mail — 25%

Students using telecommunications to support learning — 25%

Students regularly using technology in the learning process — 30%

0%   20%   40%   60%   80%   100%

Source: OSPI 1993 Statewide Survey

A Gap Analysis...

Understanding where you are, where you want to be and then strategizing how to get there...

Vision

Leadership

Resources

Implementation
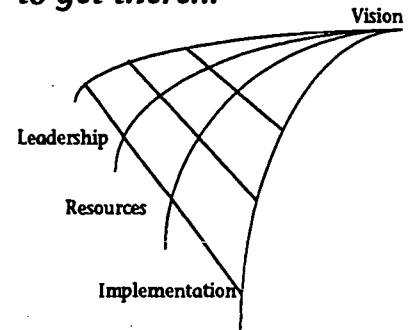
Enhancing learning through technology requires more than just the access to equipment, services and networks, it requires new ways of teaching, new roles for learners, new learning goals, different uses of time and resources, and a strong support system for educators.

The student in the Seattle School District who spends his/her evening at the community center finishing his/her research for a report on Jupiter by tapping into Internet via a computer station provided by the school district.

And...

The student in eastern Washington's Pullman School District who is the sound editor for the daily news show produced and broadcast through the school's cable system. This student daily experiences what it's like to work on a news team, juggling deadlines with levels of quality, imagination with technical limitations and the latest peer reviews with balanced coverage of news.

A Technology Vision for K-12 Students
The following vision serves as a basis for this plan:

> "In a society increasingly dependent on information, a critical component of education is equitable and universal access to technology, media and information resources.
>
> With these tools and the guidance of skillful educators, as well as community members, students take responsible roles in their own learning, and are actively engaged in creating learning environments as they think, solve problems and communicate in collaborative and interdisciplinary settings. Students emerge as lifelong learners, productive members of the work force, and contributing citizens."
>
> Education Technology Advisory Committee

Technology and telecommunications are essential to the education of today's student both in the context of attaining the state learning goals and in his/her future economic viability in a technological age. Effective use of technology will require students to be:
- information navigators,
- critical thinkers and analyzers using technology,
- creators of knowledge using technology and media,
- effective communicators using a variety of media,
- discriminating selectors of technology tools for specific purposes,
- technicians, and
- responsible citizens, workers, learners, community members and family members in a technological age.

Issues, Challenges and Opportunities
The plan to integrate technology into the K-12 education system must be systemic. That is, it must consider all issues and opportunities affecting today's schools including:
- education reform initiatives,
- the importance of equity issues,
- the key role parents and the community play in K-12 education,
- research which clearly demonstrates that, combined with appropriate teaching methods, technology and telecommunications do increase academic achievement,
- the importance of school-to-work transitions,
- the key role the K-12 system plays in the economic future of students as well as the state,
- privacy and security issues as telecommunications access increases,
- the critical need for public involvement and input into the educational change process, and
- the role telecommunications regulatory issues and business and industry play in shaping this new system.

This plan approaches the integration of technology into K-12 schools by weaving all of these challenges and opportunities into the proposed recommendations. This systemic approach is critical to the success of the plan.

Bridging the Gaps: Legislative Recommendations

Washington State has made great strides in education technology through both state level and local initiatives. These recommendations are proposed as interdependent components of a comprehensive plan which will result in increased educational benefits for all K-12 students.

The strategies employed support the common belief that significant systemic change can and must happen at the local level, but only through a combination of state leadership, alliances among all stakeholders, local empowerment, adequate resources and commitment through ongoing staff development, strategic planning and incremental implementation.

Bridging Leadership Gaps

- ### Recommendation #1: Integration of Technology into Educational Initiatives
  It is recommended that the OSPI, the Commission on Student Learning, the school-to-work initiatives and the Goals 2000 Committee consider technological implications and opportunities as this state's new education system is established. Furthermore, that the statewide Education Technology Advisory Committee (ETAC) serve in an advisory capacity in all matters pertaining to educational technology and information policymaking in K-12 for those groups; and that ETAC serve as an advocate for education in the telecommunications regulatory process. [1995-97: $49,000]

- ### Recommendation #2: Partnerships, Alliances and Public Awareness
  It is recommended that the Legislature fund OSPI to launch alliances, partnerships and public awareness initiatives which gain broad-based public and private understanding, and support and funding for the integration of technology and telecommunications in K-12 education. [1995-97: $600,000]

- ### Recommendation #3: Affordable Telecommunications Access for Schools
  It is recommended that the state assist K-12 school districts in securing affordable access to telecommunications services and equipment through: aggregated purchasing; establishment of K-12 education as a market through education and advocacy; support for education/community/business partnerships which prototype leveraging of resources; establishment of tax incentives for the high-tech industry to assist schools in securing affordable access; and legislative action to ensure K-12 access to channel capacity and production support through existing cable systems. [1995-97: $2,619,900]

"Technology is increasingly vital to our economy. It is imperative that our children be prepared to move into the 21st century, and it is never too early to start."

Representative Tracey Eide Washington State House of Representatives

"Leadership is having the imagination to see the possibilities, the intelligence to create the vision and the courage to make it happen."

Education Technology Advisory Committee

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- **Recommendation #4: State Policies and Funding Strategies Which Reflect Schools' Technology Requirements**
  It is recommended that all development, adoption and/or revision of policies and procedures for the common school system by the State Legislature, the State Board of Education, the Commission on Student Learning and OSPI reflect current technological requirements for learning. [1995-97 biennium: $0]

- **Recommendation #5: Levy and Bond Regulations Which Reflect Schools' Technology Requirements**
  It is recommended that the State Legislature enact legislation to revise current constitutional and statutory language regarding bonds and levies to give school districts increased flexibility to effectively deploy, operate, upgrade and maintain technology and telecommunications in the K-12 education system. [1995-97 biennium: $0]

Bridging Resource Gaps
- **Recommendation #6: State Allocation to Districts for Technology**
  It is recommended that the Legislature establish and fund an ongoing technology grant program through OSPI to grant funds to school districts to equitably support all students' learning through technology and telecommunications. Prior to receiving such grants, school districts would be required to develop, implement and assess technology plans focused on student learning.
  [1995-97: $100,089,690]

- **Recommendation #7: Regional Support for Educational Professionals**
  It is recommended that the Legislature increase funding to OSPI and the Educational Technology Support Center program in the ESDs to:
  1) expand services in networking to meet current demand, and
  2) work with institutions of higher education and the Commission on Student Learning in developing and implementing new staff development models which support new education reform initiatives. [1995-97: $1,457,000]

- **Recommendation #8: Enhancing K-12 Education's Statewide Electronic Network**
  It is recommended that the Legislature appropriate funds to OSPI for the enhancement, extension and continued operation of a state backbone (leveraging off all existing educational and governmental systems where possible) for the K-12 common schools across the state. And, furthermore, to connect schools to other learning resources such as public libraries, community and technical colleges and institutions of higher education. [1995-97: $2,148,100]

- **Recommendation #9: Providing Electronic Destinations**

  It is recommended that the Legislature appropriate funds to OSPI to support the conversion of data (text, video, audio, imagery, etc.) into electronic form to be made available to Washington K-12 learners at reduced rates. Priority will be given to in-state entities (e.g., universities, libraries, classrooms, museums, resource agencies). It is further recommended that the state secure rights to curricular resources deemed necessary by school districts (e.g., electronic access to an atlas, encyclopedias, archival series of images on the Holocaust, Civil Rights video images, etc.).
  [1995-97 biennium: $550,000]

Bridging Implementation Gaps:

- **Recommendation #10: Integrating Technology into the Curriculum**

  It is recommended that the Legislature appropriate funds to OSPI to develop, implement and assess technology-based curriculum projects which support Washington State's educational reform in cooperation with school districts, educational service districts, the Commission on Student Learning, the Center for the Improvement of Student Learning and higher education institutions.
  [1995-97 biennium: $996,570]

- **Recommendation #11: Technology in Teacher Preparation Programs**

  It is recommended that the Legislature appropriate funds to OSPI to pilot new models of training for prospective teachers, incorporating new technology-based instructional strategies and strong linkages between K-12 schools and state-approved teacher preparation programs. The pilots would be in partnership with the State Board of Education, the Higher Education Coordinating Board, the State Board for Community and Technical Colleges and institutions of higher education. It is further recommended that the State Board of Education and OSPI, with advisement from the Professional Education Advisory Committee (PEAC), incorporate technology in the current study on performance-based teacher certification.
  [1995-97: $646,100]

- **Recommendation #12: Information Policies**

  It is recommended that school boards review current policies to ensure that they appropriately address policy issues related to technology and telecommunications. And, that the Legislature provide funds to OSPI to coordinate the development and dissemination of model information policies related to technology and telecommunications for local school boards. Policy issues include: intellectual freedom, acceptable use of telecommunications services, privacy, security and confidentiality of data, etc.
  8[1995-97: $150,000]

"This plan is a blueprint for technology in Washington K-12 schools. With it we can move intelligently to bring technology to all our state's students and classrooms."

Senator Dwight Pelz
Washington State Senate

"A systems approach is required to take full advantage of the learning possibilities technology brings to education.

That means that technology should not be an add-on, but rather an integral part of the way learning is accomplished at the student, educator, building, district, community and state levels."

Education Technology Advisory Committee

Summary

> "It is time for the schools to invest in technology... schools (should) seize on the promise of new technologies to increase productivity, enhance student learning and expand learning time."
>
> 1994 Prisoners of Time Report
> National Education Commission on Time and Learning

> "With intelligent, thoughtful integration into the K-12 education system, technology and telecommunications can serve as levelers and equalizers, bringing all children new opportunities to learn."
>
> Judith A. Billings
> State Superintendent of Public Instruction

Technology and Education Reform

The 1990s represent a "window of opportunity" for significant education reform which will not be possible without the use of technology and telecommunications. In many ways, education reform is necessary because of technology. With the depth of change technology has caused in political, social, cultural, environmental and economic areas, the National Education Commission on Time and Learning suggests that it is time for the schools to "invest in technology... schools (should) seize on the promise of new technologies to increase productivity, enhance student learning and expand learning time."

A Blueprint for Washington State

The recommendations in this plan are intended to provide a comprehensive, systemic approach to educational technology for those responsible for the K-12 common school system—the State Legislators, the Governor, the State Superintendent of Public Instruction, the State Board of Education, the Commission on Student Learning, professional associations, labor, business and industry, the community and technical colleges, institutions of higher education, parents, educators, students and community members—over the next six years.

Implementation of the recommendations is contingent upon available funding. The Superintendent of Public Instruction will aggressively seek funds to support this plan and to support linkages among and between all stakeholders in pursuit of the vision articulated by the Education Technology Advisory Committee.

Each one of these recommendations is absolutely critical for this comprehensive systemic state plan to benefit K-12 students in Washington State. Together these recommendations form a systems approach to improving learning through technology and telecommunications. Successful implementation of this blueprint will require a strong alliance among all stakeholders, working together for the good of children and youth across this fine state.

Student Attainment of the New Learning Goals

Technology and telecommunications will serve as catalysts for the change in K-12 education outlined in the Education Reform Act of 1993. With intelligent integration into the K-12 education system, technology and telecommunications can serve as levelers and equalizers, providing each child and youth equitable opportunities to emerge from the Washington common school system as a productive worker, contributing citizen and responsible family member.

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Fiscal Summary

Washington State has made great strides in education technology through both state-level and local initiatives. These recommendations will build on current initiatives to move Washington State toward the vision. Specific detail on each recommendation can be found in the Recommendations Section.

Recommendations	1995-97	1997-99	1999-2000
#1 Advocacy for Technology in Education Reform/ Regulatory Issues	$ 49,000	$ 40,000	$ 20,000
#2 Partnerships, Alliances and Public Awareness	600,000	600,000	400,000
#3 Affordable Telecomunications Access for Schools	2,619,900	2,500,000	1,000,000
#4 State Education Funding Which Reflects Technology	0	0	0
#5 Review of Levy and Bond Regulations for Technology	0	0	0
#6 School District Allocation for Technology	100,089,690	150,000,000	200,000,000
#7 Regional Support	1,457,000	1,400,000	1,400,000
#8 Enhancing the K-12 Statewide Electronic Network	2,148,100	1,800,000	$1,200,000
#9 Electronic Destinations	550,000	1,550,000	550,000
#10 Integrating Technology into the Curriculum	996,570	1,500,000	1,500,000
#11 Integrating Technology into Teacher Preparation Programs	646,100	800,000	1,200,000
#12 Information Policies	150,000	75,000	75,000
Totals	$109,306,360	$160,265,000	$207,345,000

Washington State Technology Plan for K-12 Common Schools

Legislative Charge

The State Legislature charged the Superintedent of Public Instruction with the development of a state technology plan for the K-12 common school system.

The law states that the plan shall be developed, in cooperation with an advisory committee, to coordinate and expand the use of education technology in the common schools of the state and address at a minimum:

(a) The provision of technical assistance to schools and school districts for the planning, implementation, and training of staff in the use of technology in curricular and administrative functions;

(b) The continued development of a network to connect school districts, institutions of higher learning, and other sources of on-line information; and

(c) Methods to equitably increase the use of education technology by students and school personnel throughout the state.

It also requires that the Superintendent of Public Instruction prepare recommendations to the Legislature regarding the development of a grant program for school districts for the purchase and installation of computers, computer software, telephones, and other types of education technology.

The recommendations shall address methods to ensure equitable access to technology by students throughout the state, and methods to ensure that school districts have prepared technology implementation plans before applying for grant funds.

Process

In October of 1993 Superintendent Billings convened a 28-member Education Technology Advisory Committee to assist in the development of a state technology plan. This group, which represents a diverse mix of K-12 education stakeholders, has invested significant time and energy in the development of this plan.

The Committee's recommendations represent thoughtful analysis of the issues and include the careful synthesis of the information received through seven public hearings conducted to solicit comments and/or suggestions, and input from meetings with many high technology business and industry representatives in Washington State.

Approach

The plan that has been developed in response to this legislative charge is a blueprint for K-12 progress in readying students for living, learning and working in the 21st century.

The Education Technology Advisory Committee approached the development of the plan through a gap analysis. They developed a vision, assessed the current status of technology in Washington K-12 schools, analyzed current trends and issues and then developed recommendations to bridge the gap between what is and what ought to be in Washington State schools today.

The plan is based on strong beliefs that:
- the successful implementation of technology in schools is a long-term commitment and should be done in conjuction with education reform efforts focused on improved student learning;
- the state must take a leadership role in assuring equity of access to technology, media and telecommunications;
- change happens at the local level by informed, committed and supported stakeholders who must be integral to the implementation of the plan;
- state policies and procedures for educational technology should provide local school districts with flexibility within a state framework;
- ongoing planning and staff development is integral to the success of the plan;
- school districts will have to redirect and reprioritize existing dollars to sustain and support the use of technology for learning;
- funding beyond current levels will be required to re-tool schools and provide the ongoing technical and curricular support necessary for successful integration of technology into the learning process; and
- as school districts improve their technology infrastructure they will need guidelines in facilities design, standards and protocols for equipment and continued access to up-to-date information on emerging technologies.

The Superintendent of Public Instruction and the Education Technology Advisory Committee proudly present this plan to the Washington State Legislature.

This plan is not about technology alone, this plan is about learning!

Judith A. Billings
State Superintendent of Public Instruction

"This technology plan is a blueprint for preparing Washington students to live, learn and work in the 21st century."

Education Technology Advisory Committee

Vision

for K-12 Education Technology in Washington State

"In a society increasingly dependent on information, a critical component of education is equitable and universal access to technology, media and information resources.

With these tools and the guidance of skillful educators as well as community members, students take responsible roles in their own learning, and are actively engaged in creating learning environments as they think, solve problems and communicate in collaborative and interdisciplinary settings. Students emerge as lifelong learners, productive members of the workforce, and contributing citizens."

1993-1995
Education Technology
Advisory Committee

Basic Principles

Five principles form the basis for the state plan:

1. **Economic Viability is at Stake**
   In our rapidly changing world, the economic viability of communities and individuals depends on the ability to access information, build knowledge and solve problems. Technology plays a key role in this process and students must develop skills in its use.

2. **Equitable, Universal Access is Essential**
   Now and in the future all learners and educators must have equitable and universal access to information and technology and be skilled in technology applications.

3. **Communication Linkages are Critical**
   Communication linkages among all of the *stakeholders in a child's life are critical to the education and well-being of the whole child. Technology is a key element in establishing these vital linkages. Integration of technology in education should not diminish the privacy of individual students, teachers or families.

4. **Technology is Essential to Education Reform**
   The use of technology is essential to the reform of schools through:
   - increased access to information in a context constructive to learning;
   - increased application of appropriate instructional, management and assessment tools;
   - new strategies and tools which involve students in creating and producing meaningful knowledge; and
   - greater relevance to the community and workplace.

5. **Systemic Change is Required**
   Effective use of technology in schools in Washington State must be based on coordinated planning and funding efforts at the state, regional, and local levels. To effect change, factors such as training, support, and time must be addressed simultaneously.

*Stakeholders in this process include, but are not limited to: educators and support personnel from all levels, students, parents, community members, business and industry representatives, labor and union representatives, governmental agencies, the Office of Superintendent of Public Instruction, the State Board of Education, the Commission on Student Learning and the Legislature.

> *"Many businesses are drawing a strong linkage between technology-based education and economic development. They believe that a technology proficient workforce will improve the state's economic viability."*
>
> **Kathy Panfili**
> **Washington**
> **Roundtable**

Seven Essential Learnings for Technology

Effective use of technology will require students to develop new roles in learning, living and working. The following essential learnings for technology should be woven into the work of the Commission on Student Learning as they develop essential academic learning requirements, performance standards, and assessments for all academic areas.

1. *The student as information navigator.* The student recognizes and values the breadth of information sources, browses those sources, differentiates and selectively chooses sources, and retrieves appropriate information/data using all forms of media, technology and telecommunications.

2. *The student as critical thinker and analyzer using technology.* The student reviews data from a variety of sources, analyzing, synthesizing and evaluating data to transform it into useful information and knowledge to solve problems.

3. *The student as creator of knowledge using technology, media and telecommunications.* The student constructs new meaning and knowledge by combining and synthesizing different types of information through technology, telecommunications and computer modeling/simulations.

4. *The student as effective communicator through a variety of appropriate technologies/media.* The student creates, produces and presents ideas, stories and unique representations of thoughts through a variety of media by analyzing the task before him/her, the technologies available, and appropriately selecting and using the most effective tool(s)/media for the purpose and audience.

5. *The student as a discriminating selector of appropriate technology for specific purposes.* The student discriminates among a variety of technologies and media to extend and expand his/her capabilities.

6. *The student as technician.* The student develops sufficient technical skills to successfully install, setup and use the technology and telecommunications tools in his/her daily life, work situations and learning environments.

7. *The student as a responsible citizen, worker, learner, community member and family member in a technological age.* The student understands the ethical, cultural, environmental and societal implications of technology and telecommunications, and develops a sense of stewardship and individual responsibility regarding his/her use of technology, media and telecommunications networks, respecting historical context and enhancing cultural lineage with integrity and concern for truth.

"If time management through technology is becoming the currency of the 21st century, it is my hope that our educational system provides opportunities for all to become proficient in changing technologies."

Harry Petersen
State Board of
Education

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The Fit with State Education Reform Initiatives

The Commission on Student Learning

The work of the Commission on Student Learning and the technology initiatives were authorized under the same legislation, the 1993 Education Reform Act. As such, the act specifically states, "the legislature recognizes that up-to-date tools will help students learn... workplace technology requirements will continue to change and students should be knowledgeable in the use of technologies."

A member of the Commission on Student Learning serves on the Education Technology Advisory Committee (ETAC) and a member of the ETAC serves on the Communications Subject Area Committee for the Commission. The Advisory Committee has closely followed the Commission's development of the essential academic learning requirements (currently in draft form) on Communications, Reading, Writing and Mathematics.

Since technology is not listed in statute as an academic area it is the recommendation of ETAC that the Commission weave technology into all academic areas. To facilitate that process, a subcommittee developed the seven essential learnings for technology (included in this report) and submitted those to the Commission as a basis for integration into the academics. ETAC also critiqued the drafts of the essential learnings and made specific recommendations as to how to integrate the technology essential learnings into those documents. Those recommendations will be considered as the Commission finalizes those areas.

In addition, the Advisory Committee recommended individuals with technology backgrounds to the Commission for membership on the new Subject Advisory Committees. The Commission has honored most of those recommendations with appointments.

One of the recommendations in this document is that the Advisory Committee serve in an advisory capacity to the Commission on Student Learning during the 1995-97 biennium. This will be particularly important as the essential learnings continue to be developed, standards are completed and the design of the performance-based assessment system is under consideration.

> *The Education Technology Advisory Committee is working with the Commission on Student Learning to weave technology into the state's essential academic learning requirements...*
>
> *that committee will act in an advisory capacity as the performance-based assessment system is designed.*

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Vision Scenarios

These scenarios are intended to provide a picture in the mind of the reader of the powerful learning opportunities this plan will bring to all K-12 Washington students.

Consumer Protection

Kelly, Maria and Ng are engaged in checking out safety features and reliability of the newest toys for toddlers. This project was sparked through student participation in an on-site daycare program. As a part of their physics class, these students gather and analyze data about the toys. They use probes and other technologies connected to computers to check features such as strength of materials under different conditions and the accuracy and speed of toys under repeated testing.

They use wordprocessors, desktop video, camcorders and digital cameras to produce videotapes and publications which demonstrate their analyses of the various safety features to the toy manufacturers. These students have had the satisfaction of knowing that they made a recommendation to a toy manufacturer which ultimately was used to improve the safety of a toy.

Relevancy in learning...

Communication with the Community

In Ms. Jongejan's Yakima classroom children are gaining self-confidence in their own ability to influence the health of their environment. The class is actively involved in a community-based wetlands project in which students use wordprocessors to write letters to the community, correspond with practicing environmental scientists electronically across networks, access information on the electronic encyclopedia on CD-ROM, maintain a database on birds and animals on wetlands and use desktop publishing to prepare and publish reports for presentation to community groups.

During the last legislative session students conducted research on a bill regarding the salmon runs in Washington State and testified at a legislative hearing by joining a two-way interactive videoconference between Yakima and Olympia.

Civic responsibility in learning...

A Seamless World

George and Kimberly attend a project-oriented high school in Seattle. They applied and interviewed for a "job" on the school communications team and earned spots as editorial page editor and layout editor respectively. Being blind has not deterred George from actively participating in the project.

Using his computer, which is equipped with voice output and Internet access to newspapers, journals, an electronic encyclopedia and other information resources, he collects, analyzes, and synthesizes information for his editing. He is able to communicate

Interfaces for learning...

94 WASHINGTON STATE TECHNOLOGY PLAN FOR K-12 COMMON SCHOOLS   25   TOMORROW: TECHNOLOGY IN K-12 SCHOOLS

his thoughts and ideas with his classmates through Braille as well as standard print, and publishes it on-line for audiences to read and respond. Throughout the year they have been collaborating with schools in Mexico and Canada.

Together, the schools create a monthly newsletter on trade and economic issues. To get an article published in the newsletter, each school submits articles to a review board representing students from all three schools. The wires were burning this year as students researched, discussed and published on-line articles and editorials about the implementation of international trade agreements.

Info-Grazing to Save the Harvest

Critical thinking and problem-solving in learning...

Melody, Wolfgang and Kim, three biology students whose parents earn their livings fishing for salmon, decide to investigate what can be done to bolster the declining salmon harvest in their area. Gathering in a research nook of the school's community resource center one afternoon they spend an hour tele-interviewing a manager from the state agency responsible for this issue.

The manager agrees to electronically link them documents outlining existing state plans and initiatives. They then begin info-grazing with their hand-held electronic devices. A user-friendly software program prompts them to pose clear questions. They ask for strategies that have proven effective elsewhere in the world where fishing is critical to the economy. Routed through a global electronic highway system, in moments they begin to note news stories, videos and resources and download them into their computers for later perusal. In a matter of hours they have expert testimony, field data and anecdotes from other fishing communities.

School-to-Work Transitions

Marge and Antony have recently received their Certificate of Mastery from their high school in rural eastern Washington. Both have opted to explore high-tech industry and international finance during their last two years of school.

Work experiences in learning...

Today they had an interview with Assymetrix in Bellevue and one with the Seattle Trade Center, both via videoconference. When they do get connected with a company, most of their work will be via videoconference and communications across Internet with a variety of experts globally. The program they are developing is unique to them and involves one class at their high school, a class with a local agriculturalist who deals in international trade, a couple classes through the community college (also done electronically), and this internship with a company.

A local high school teacher, working with the students and their families, designs a learning experience using local community resources, a state pool of class offerings via telecommunications, and a cadre of experts from business and industry to meet the needs and career interests of the student.

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Why Technology in Schools...
Research, Reform and Exemplary Practice

The K-12 schools no longer reflect today's society. Technology is pervasive in the contemporary home and workplace. When an electrical storm cuts the power in Redmond, Microsoft employees go home because the computer, fax, phone and network essential to their jobs are down. But visit a classroom in your neighborhood and chances are you won't find many of those contemporary workplace tools. What you probably will find is a 19th century classroom trying to prepare 21st century youth, and that dichotomy is reflected in the drop-out rates, youth violence and the lack of skills that deter our youth from succeeding in today's workplace.

As David Thornburg, a special advisor to the White House on educational technology, so succinctly states, "Schools must prepare our children for their futures, not this generation's past."

A 1992 report funded by the National Science Foundation, Computers in American Schools 1992: An Overview, found that "The U.S. and its major trading partners are in competition for high skills, high wage jobs. Critical in that competition is improving the techniques of our educational system and teaching mastery of the tools of the Information Age. Yet, compared to Austria, Germany and the Netherlands, American students are less computer-knowledgeable, their teachers get less training, and their equipment is more out-of-date."

The Washington State Legislature has recognized the urgency for reform in K-12 education. Technology and telecommunications are catalysts for educational change as well as tools for learning, productivity and discovery. Legislators expect students to emerge from the K-12 system as productive workers, contributing citizens and responsible family members. In today's technological age, students will not be able to reach these goals unless technology and telecommunications are integrated into the learning process.

Technology in Schools
A look around the nation and the state suggests three major reasons for technology in schools:
1. Research, prototypes and national/local surveys conclude that technology can play a critical role in students' successful attainment of the four state learning goals;
2. Economic trends as well as reports from business and industry clearly state that K-12 students' economic viability as they enter the workforce is dependent on their acquisition and application of technology skills; and
3. Current practice and business trends suggest that school systems can increase functionality and efficiency through technology.

"...most of this literature finds newer technologies to be either equivalent or superior to conventional instruction with regard to student learning..."

The Office of Education Research, U.S. Department of Education (1993)

"There is substantial research literature that strongly supports ways in which computer-related technology improves schools."

Vision: TEST (Technology Enriched Schools of Tomorrow) **International Society for Technology in Education**

> *"...(teachers using technology) perceive a change in their expectations about student performance— they expect more of their students and can present more complex material..."*
>
> *Karen Sheingold*
> <u>Integrating Computers into Classroom Practice</u>
> *Bank Street College*
> *Columbia University*

Student Attainment of the New State Learning Goals

Within this education reform context, the integration of technology into the learning process is neither simply to speed up the process of learning nor to just teach new technology skills. Rather, the intent of the integration of technology under the Reform Act is to add a catalyst and technological factor which, combined with other reform efforts, will help schools become learning environments which empower students to successfully attain the new state learning goals.

Technology and telecommunications can serve as the means to assist students in attaining the new learning goals established in Washington State:

- Electronic gateways for students and educators to access resources, classes, experts, peers, instructors and information that is timely, up-to-date and relevant to today's student.

- New and/or more accessible forms of media (visual, auditory, imagery, text, musical, etc.) and learning tools for students and educators to use in browsing, accessing, processing, analyzing, problem-solving, organizing, producing and communicating information, knowledge and wisdom.

- Increased alignment between the applications of technology in the schools with those of the contemporary workplace.

- Improved learning environments which engage students in self-directed, guided activities in which the skills of teaming, collaboration, critical thinking and communication are learned and applied, connecting a framework of academics with meaningful, real-life experiences for students.

- Tools and techniques which enable educators to design and implement a performance-based assessment system.

- Shifting the roles of teacher and student to provide more independent work by the student and more coaching and facilitating by the teacher.

- Learning tools which enable educators to provide multiple learning approaches to meet the needs of individual children and youth.

Further analysis of the educational research in technology for learning is included in the appendix of this report.

New State Learning Goals

The goal of the Basic Education Act for the schools of the state of Washington is "to provide students with the opportunity to become responsible citizens, to contribute to their own economic well-being and to that of their families and communities, and to enjoy productive and satisfying lives."

The four state learning goals are to:

1. Read with comprehension, write with skill, and communicate effectively and responsibly in a variety of ways and settings;

2. Know and apply the core concepts and principles of mathematics; social, physical, and life sciences; civics and history; geography; arts; and health and fitness;

3. Think analytically, logically, and creatively, and to integrate experience and knowledge to form reasoned judgments and solve problems; and

4. Understand the importance of work and how performance, effort, and decisions directly affect future career and educational opportunities.
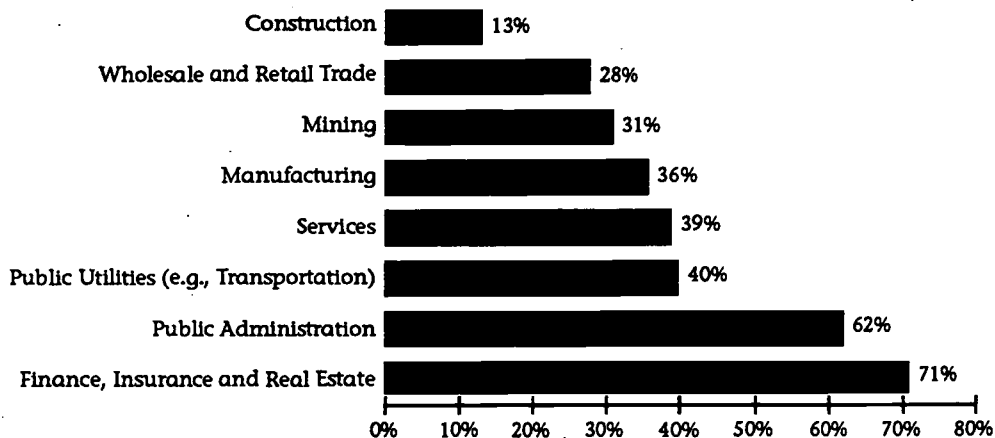
Economic Viability of Washington's Future Workforce

Emerging technologies have significantly changed the American way of life and, even more significantly, the corporate culture of American businesses and industries. Increasing numbers of workers are using technology as a part of their everyday work life.

Percent of workers using computers on the job by industry

Industry	Percent
Construction	13%
Wholesale and Retail Trade	28%
Mining	31%
Manufacturing	36%
Services	39%
Public Utilities (e.g., Transportation)	40%
Public Administration	62%
Finance, Insurance and Real Estate	71%

Bureau of Census 1989

Examples abound. The Boeing 777 was designed and tested strictly through computer-modeling; "dark" factories (without people, therefore without the need for light) manufacture products using robotics exclusively; and eastern Washington farmers compete on world markets by carefully tracking production and crop prices and monitoring watering schedules via technology.

The American Electronics Association (AEA) contends that "today's workplace requires a different approach." The AEA suggests that "to stay on top in increasingly competitive markets... employers need to tap the full range of skills and talents within their workforce. Workers need to know how to use technology, analyze and fix complex problems, and improve production processes."

Just as business and industry have different requirements of workers, the 1993 State Legislature enacted new learning goals for today's K-12 students (listed on opposite page). Independent learning, critical thinking and communication skills are what business and industry are seeking in employees. The student today who has a strong background in only the three traditional "Rs" is prepared for yesterday's workforce. Without further training such individual's resume will not get him/her interviews for careers in the information age workforce.

"Our present education system does not prepare students to enter a workforce that has been drastically altered by the globalization of commerce and industry, and the explosive growth of technology on the job."

The SCANS Report 1991 Secretary's Commission on Achieving Necessary Skills, U.S. Department of Labor

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> *"...to stay on top in increasingly competitive markets employers need to tap the full range of skills and talents within their workforce. Workers need to know how to use technology..."*
>
> *American Electronics Association (1994)*

The challenge to schools in preparing students for a successful transition from school-to-work is multifaceted. Technology and telecommunications are part of the solution. In addition to critical thinking and problem-solving skills, students must understand and be able to use productivity and information accessing tools. Telecommunications also provide communication channels through which students can access desired courses, learn from expert instructors, interact with peers and/or experts, demonstrate expertise, and gain work experience from a distance.

Increased Efficiency and Functionality of Today's Schools

The business side of education includes fiscal management, administration, personnel management, facilities management, transportation support, student records, assessment and accountability reporting.

Most Washington schools are currently using technology and telecommunications to maintain fiscal and student records as well as manage other areas of school administration. The Washington School Information Processing Cooperative reports that 277 of the 296 school districts are members of the cooperative and others are using alternate systems.

> *Records of students' products and performances on the essential academic learning requirements can be captured through visual images, full-motion video, audio, text and graphics and stored digitally for retrieval at will.*

As the Washington State Commission on Student Learning begins the development of the performance-based assessment system, technology must be a critical design factor. Emerging technologies and telecommunications enable educators to capture performance-based data in forms never before available. Records of students' products and performances on the essential academic learning requirements can be captured through visual images, full-motion video, audio, text and graphics and stored digitally for retrieval at will. These possibilities as well as the issues of privacy, security and confidentiality must be addressed as this new performance-based system is designed.

In addition, school personnel must be provided with the tools, training and support necessary to become as skilled as their business contemporaries in the use of technology, media and telecommunications for communication, administration and management of resources.
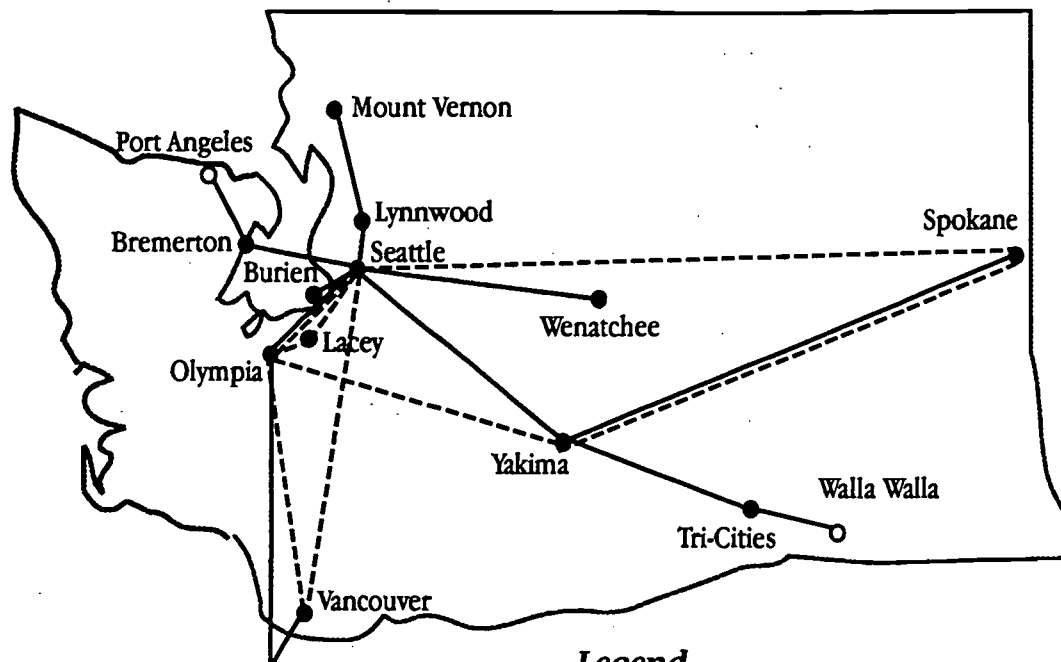
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State
of the State

Current Initiatives and Accomplishments

A current assessment of the state confims that educators and citizens in Washington State are committed to improving student learning through technology and are making progress, yet have a long way to go.

- Since 1989, over $164 million in technology bonds and levies have been passed by voters and used at the local level for technology in schools.

- Nearly 80% of Washington State school districts are now implementing a technology plan or are developing or revising a technology plan.

- Over 640 of the 1,800 Student Learning Improvement Plans submitted to the state by school buildings in the spring of 1994 include technology staff development and/or planning.

- The regional NCCE (Northwest Council for Computers in Education) conference for educators registered over 2,600 participants last spring, with nearly 3,000 expected at the 1995 spring conference.

- During the last year, over 50 of the 296 school districts established routed (direct line) connections to Internet for curriculum and instruction purposes through the state network. Districts are beginning to install networks which connect classrooms and learning centers to the state network.

Despite these efforts, technology is not an everyday learning tool for the majority of K-12 students in the state. This section of the plan outlines current initiatives as well as challenges, issues and opportunities before K-12 educators in the area of technology, media and telecommunications.

Technical Infrastructure: K-12 Education

Map of Washington State showing cities: Mount Vernon, Port Angeles, Lynnwood, Bremerton, Seattle, Burien, Spokane, Wenatchee, Lacey, Olympia, Yakima, Walla Walla, Tri-Cities, Vancouver
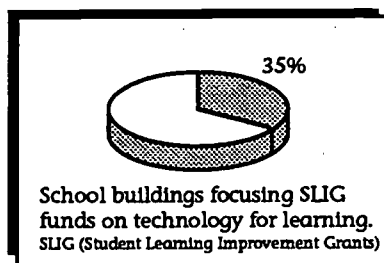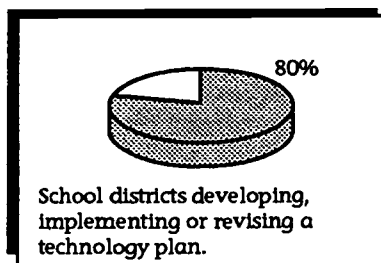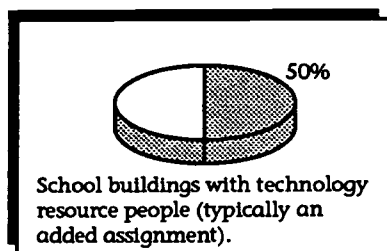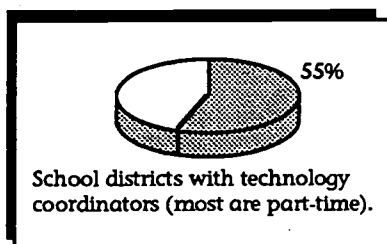
Legend

────────── T-1 Backbone for WEdNet
(Washington Education Network)

— — — Digital Transport System
(Operated by Department of Information Services)

● Washington Interactive Television
Videoconferencing Sites

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Current Technology Initiatives/Status Quo

A Snapshot of Technology in Schools

Data on the Fall 1993 Statewide Technology Survey indicates both interest and commitment among school districts to the integration of technology into the learning process:

55%
School districts with technology coordinators (most are part-time).

50%
School buildings with technology resource people (typically an added assignment).

80%
School districts developing, implementing or revising a technology plan.

35%
School buildings focusing SLIG funds on technology for learning.
SLIG (Student Learning Improvement Grants)

Source: OSPI Data

Despite those efforts, many model projects and exemplary technology initiatives in school districts across the state, technology and telecommunications have yet to be integrated into the learning process.

A 1993 statewide survey of districts indicates:
- Less than 33% of K-12 students use technology regularly within their learning environment;
- Less than 25% of school buildings use electronic mail;
- Less than 10% of educators and/or students have Internet access;
- Less than 25% of students use telecommunications access to support learning; and
- Less than 10% of school building libraries are on-line.

To ensure that all children have access to information and technology for learning, the state must take a leadership role.

Less than 33% of Washington State students use technology regularly within their learning environment.

"...compared to Austria, Germany and the Netherlands, American students are less computer-knowledgeable, their teachers get less training, and their equipment is more out-of-date."
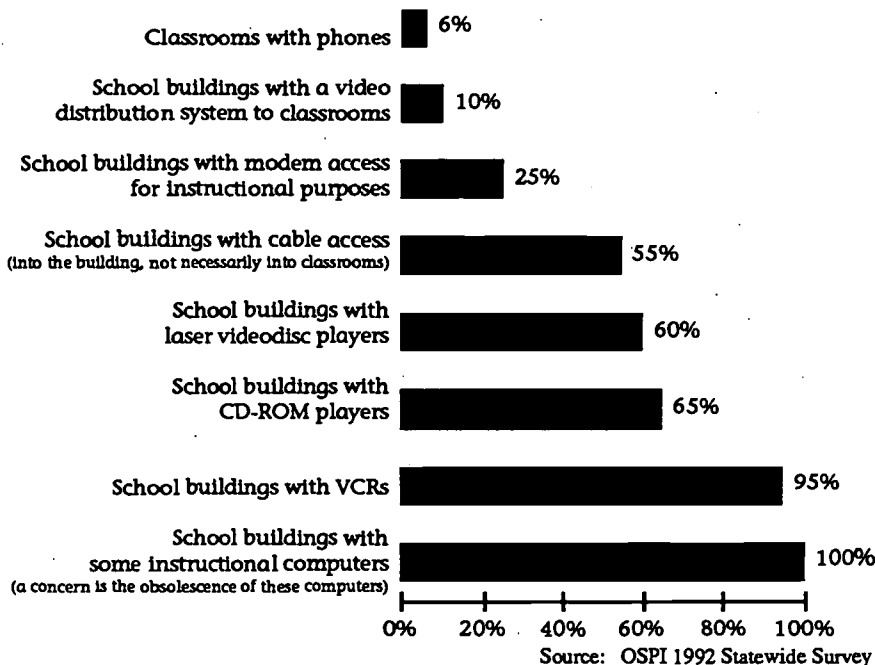
<u>Computers in American Schools 1992: An Overview</u>
A study funded by the National Science Foundation

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Equipment and Networking in Schools

A statewide technology survey of school buildings is conducted every two years by the Office of Superintendent of Public Instruction. The 1994 statistics will be available in late December of 1994. The following statistics are from the fall of 1992:

Equipment and Networking in K-12 Schools

Classrooms with phones	6%
School buildings with a video distribution system to classrooms	10%
School buildings with modem access for instructional purposes	25%
School buildings with cable access (into the building, not necessarily into classrooms)	55%
School buildings with laser videodisc players	60%
School buildings with CD-ROM players	65%
School buildings with VCRs	95%
School buildings with some instructional computers (a concern is the obsolescence of these computers)	100%

0% 20% 40% 60% 80% 100%

Source: OSPI 1992 Statewide Survey

While the statistics indicate the presence of technologies in most buildings, there is not the critical mass of equipment necessary to engage students in significant learning activities using technology, nor is there the trained staff necessary to effectively integrate the use of the technology into the curriculum.

A 1993 national study funded by the National Science Foundation indicates that "Computers in America's classrooms are often outdated. American students have been technologically shortchanged."

Most K-12 students in Washington are not regularly using technology in school.

Leadership

The Superintendent of Public Instruction, in cooperation with key school districts and the educational service districts, continues to provide proactive state leadership through legislative requests, information exchanges, conferences, technology-based classroom pilots, partnerships, grant writing and, in cooperation with the Center for the Improvement of Student Learning, timely information dissemination.

The Educational Technology Section at OSPI is collaborating on a public awareness initiative for technology with the Goals 2000 Committee and will continue to promote the improvement of student learning through the Goals 2000 projects in the state.

Technology Initiatives: 1993 Education Reform Act

The Washington State Legislature, as a component of the 1993 Education Reform Act, allocated $4.5 million to the Superintendent of Public Instruction for K-12 technology initiatives. Those initiatives are as follows:

- **State Technology Plan.** The Superintendent of Public Instruction was charged with the responsibility of developing this state technology plan for the K-12 common schools of the state of Washington. The Education Technology Advisory Committee worked on the plan from October 1993 through August 1994 to submit the completed plan to the legislature in September 1994.

- **On-Line Curricular Projects.** The Office of Superintendent of Public Instruction (OSPI) is partnering with the ESD Educational Technology Support Centers in establishing eight on-line curriculum projects involving over 300 classrooms from across the state. Chosen from over 65 applications submitted in response to a statewide Request for Proposal, the eight projects are: It Ought to be a Law, Media as a Persuasive Force, Dinosaurs in Modern Times, Native American Nations, International Poetry Guild, 100% Weather Proof, the Best of Washington, and Making History Real. Several of these projects were piloted last spring. The 300 classroom teachers attended training sessions during the summer and are involving their classes in the projects during the 1994-95 school year.

- **Regional Support.** Nine Educational Technology Support Centers have been established at the educational service districts to provide technology inservice, networking consultation, technical support and other related services to schools and school districts. This network of centers is coordinated by the Office of Superintendent of Public Instruction. Launched last fall, they provided the following level of service to school districts and educators between January and June of 1994:

Educational Technology Support Center Services:	
305	Inservice Classes (2,155 hours)
6,179	Class Attendees
27,452	Class Contact Hours
520	Network Consultant Hours Provided
516	Staff Development Hours Provided
7,931	Event Contact Hours Provided
2028	User Group Contact Hours
675	WIT Contact Hours
788	Network Planning Hours Provided
246	Other Consulting Hours Provided
570	Technology Planning Hours Provided
2,639	Consulting Hours Provided
70	Satellite Downlink Contact Hours

The ETSC program established the Technology Action Planning Institute, launched in August 1994, to assist school districts statewide with long-range technology planning.

Students in over 300 classrooms are using the Internet in learning projects this fall, sharing data, interviewing experts, publishing their reports and communicating with their peers across the state.

Internet Message:

"Computers have given me the opportunity to do work and projects in a whole new way. I incorporate sound, text, graphics, scanned images, short clips and my own pictures. It turns the ordinary into the extraordinary and I owe it all to my teacher, Mrs. Gill."

Stephen Perry
Student, Age 13
Kelso School District

- **Enhancing the State Backbone.** The Washington School Information Processing Cooperative has increased the capacity of their administrative network to carry instructional traffic. The Washington Education Network (WEdNet) now provides access to the Internet for member schools.

  The number of school districts with routed (direct line) connections to the Internet numbers now stands at approximately 50, representing approximately one-third of the students in the state of Washington. It is then the responsibility of the district to network the classrooms, libraries, offices and building to take advantage of this connection to the state backbone. Through such networks students could maintain electronic portfolios, interact through electronic mail and access software and resources from virtually anywhere on the school campus.
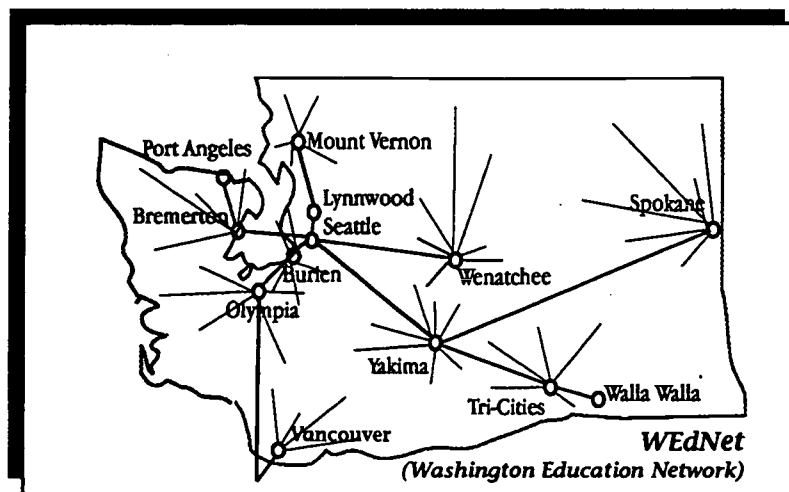

WEdNet
(Washington Education Network)

In less than a year over 50 school districts, representing more than 300,000 students, have installed routed connections to the Internet.

The next step is getting that connection to Internet into the classroom.

- **Statewide Video Teleconferencing.** The Office of Superintendent of Public Instruction has partnered with the nine educational service districts and the Washington State Department of Information Services to establish and operate the Washington Interactive Television (WIT) system. This is a statewide, two-way, interactive videoconferencing system.

• WIT Videoconferencing Sites
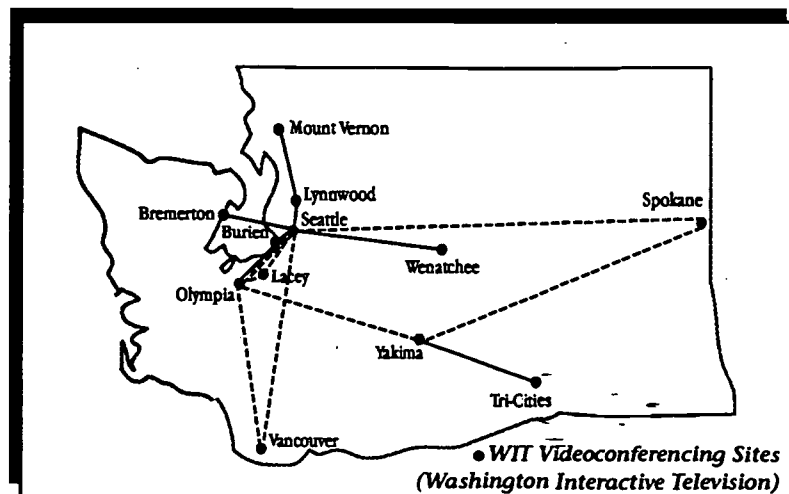*(Washington Interactive Television)*

A unique partnership among OSPI, the Department of Information Services and the ESDs is leveraging resources to provide new videoconferencing services to clients.

Special Education Technology Center

The Washington State Special Education Technology Center, located at the Ellensburg School District in central Washington, provides technical assistance, staff development, inservice and preview of special adaptive devices. The center is supported by the Office of Superintendent of Public Instruction through a contract with Educational Service District 105. Through the center, special needs children and youth learn to use technologies which enable them to communicate and learn in ways never before possible.

Instructional Television

The public broadcast stations in Washington State provide instructional television services and on-line telecommunications services to 125 subscribing school districts, impacting 411,000 students and 29,000 educators. Seven hundred twenty hours of programming are provided annually.

The local cable companies have provided free cable drops to the majority of the schools in cabled franchises. Several of the cable companies also provide educational programming and data services to schools at minimal cost.

Local Implementation

Pioneering school districts are successfully planning, implementing and funding technology initiatives. For example:

- The Onalaska School District in southwest Washington has dedicated local funds to network their entire school campus, enabling students to maintain electronic portfolios, interact through electronic mail and access software and resources from virtually anywhere on the school campus.

- Another pioneering district is Everett School District just north of Seattle. With the successful passage of a $15.6 million technology levy (over six years) they are able to implement a plan to install local area networks interconnecting classrooms, learning centers and administrative offices within buildings and wide area networks interconnecting buildings to the state backbone. At the same time this district is carefully integrating the use of technology into the academic areas through curriculum development, software acquisition and extensive staff training.

- In Wenatchee science students study entymology out-of-doors with nets to collect specimens, and in the classroom checking the Hypercard stack on insects to identify their specimens. Through the district-wide network they electronically search the encyclopedias and access the Internet to check in with an entymologist at a local university on migratory patterns of specific insects. This class is truly beginning to integrate technology into the curriculum.

Pioneering districts across the state are carefully managing resources to bring technology to students.

For example, Onalaska, an economically depressed community, has taken the initiative to bring such resources as electronic portfolios to their students through a community-supported fiber-based network.

Pioneering districts across the state are bringing relevance, resources and job skills to their students through technology and telecommunications.

* Both Issaquah School District and Olympia School District are nationally renowned for their innovative programs in which students design, implement and operate the district network for credit in a unique class. Learning and teaming with classmates, under the direction of a qualified instructor, these students are involved in a very successful program which combines academic concepts with real-life application.

These are just a few of the many, many exemplary programs across the state which are providing rich learning experiences for children and youth through technology, media and telecommunications. One of the intents of the Washington State Technology Plan for K-12 Schools is to leverage those experiences through exchanges and partnerships among schools.

Distance Learning

Since 1990, the Pacific Northwest Star Schools Partnership has received $16 million in federal grants to provide distance learning to schools in the five northwest states. The partnership will use the 1994-96 grant award of $3.9 million to transition to compressed video technology, offer new programming for students and new inservice courses for educators, add new schools as downlink sites and begin working with the Pacific Islands. Educational Service District 101's STEP (Satellite Telecommunications Educational Program) system in Spokane partners with RXL Communications/ Pulitzer as the hub for the five-state partnership between Washington, Idaho, Alaska, Montana and Oregon state education agencies.

The Pacific Northwest Star Schools Partnership recently received a $3.9 million grant for distance learning.

Fifteen percent of the school buildings in the state of Washington have satellite reception capabilities with 1,242 Washington students currently enrolled in full courses via satellite. Educational programming is originated via several uplink sites including ESD 101, the Washington Interactive Television studio in Lacey, the KCTS/9 mobile uplink in Seattle and the University of Washington.

A State Backbone/Regional Data Centers

The Washington School Information Processing Cooperative (WSIPC), in cooperation with the Regional Data Centers located in the educational service districts, has increased the capacity of their administrative network to carry instructional and curricular traffic.

WSIPC continues to provide fiscal and student record services to schools for the 277 (out of 296) school districts connected for administrative services. The instructional component was previously referenced under the section Enhancing the State Backbone. Many of the data centers are working with the Educational Technology Support Centers to provide districts with dial-up capacity to Internet, until more direct connections can be established.

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The Landscape

Issues, Challenges and Opportunities

Technology has the potential to serve as the catalyst for the educational change the public is seeking. To make that happen will require a broad view of issues, challenges and opportunities and action by education, business and industry, government and the community at large.

That means that education must look beyond the immediate issues of schools and begin to collaborate more closely with stakeholders. As telecommunications linkages become more critical to learning, educators must become more influential in that market. Equitable access to information and resources is at stake, with the potential of increasing the distance between the haves and the have-nots unless action is taken.

As electronic resources become available it is important that policymakers review and revise policies and procedures to reflect technology. These policy changes can increase students' learning options while maintaining high educational standards, ensuring equity of opportunity for all students, and protecting the rights of all citizens in this new technological arena.

As Washington State's new education system is designed decision makers should understand and use the potential of technology, media and telecommunications. That translates into understanding the issues, meeting the challenges and taking advantage of the educational opportunities in the technology and telecommunications arenas.

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To take full advantage of the possibilities technology brings to K-12 education will require systemic change. Technology must be woven into other initiatives in the state to collectively improve the quality of the educational experience for K-12 students.

Equity Issues

It is the paramount duty of the state of Washington to ensure a quality education for all children in the common school system. As the state transitions to a performance-based assessment system focused on student attainment of the four state learning goals, it will be critical that all children be provided an opportunity to learn. Technology will play a key role in ensuring equitable access to educational opportunity.

> *Technology will play a key role in ensuring equitable access to educational opportunity for all students.*

Systems Approach

Enhancing learning through technology and ensuring that students have the technology skills necessary for today's workforce requires more than just the access to equipment, services and networks. It requires learners who know how to ask probing questions; access and analyze sources of information; construct new meaning from the data; and then are able to effectively communicate their ideas to others. It requires educators and communities who use the technology to create enabling learning environments for all students. And it takes communities and policymakers who have the vision and courage to make the right choices for learners of the '90s.

Community Connections

Schools are the cornerstones of their local communities. In these times of diminishing resources and growing needs it is critical that all stakeholders work with schools to ensure leveraging and sharing of resources and decision making to ensure collaboration and cooperation among all entities. Community approaches to building telecommunications infrastructure leverage limited resources.

> *Community approaches to building telecommunications infrastructure leverage limited resources.*

Privacy and Access Issues

Recent and anticipated growth in the capacity of public agencies to collect, store, process, transmit and report data electronically has created some public concern over privacy issues. As technology is integrated into the K-12 education system it will be critical that the privacy of students and their families, as well as that of staff, be protected and that the data on the system be secure.

Beyond the confidentiality and security of data is the determination of use (what data may be collected and under what conditions are responses mandatory or voluntary), access (who has data access rights, under what circumstances, and for what purposes); and ownership (who owns data and who has a legitimate voice in determining the use of such data). Information policies and standards such as those by the Family Education Rights and Privacy

Act of 1974 (FERPA) attempt to protect individual confidentiality while ensuring adequate access for monitoring and policy planning. As Washington State develops a new performance-based assessment system, an accountability system and student and educator access to Internet, it will be critical that appropriate policies and/or standards are implemented.

Public Awareness

The general public is not aware of the current initiatives and accomplishments of educators and students who are effectively using technology, media and telecommunications in schools across the state of Washington today. Nor is the public generally aware of how critical it is to students' economic futures that they become aware of and be able to skillfully and intelligently use technology. As a result, the general public may be missing an opportunity to leverage the technology resources of the K-12 sector for their community, and the youth in their communities may be missing out on opportunities other communities offer through technology in schools.

The public is generally not aware of the potential technology and telecommunications bring to their students and their communities.

Timing

The power of technology for schools is in its ability to bring resources and innovations which transform schools into learning environments which match the new state learning goals and essential academic learning requirements.

Technology in schools without education reform negates the power of the innovation. Education reform without technology is like remodeling a summer house into a Frank Lloyd Wright using only a chainsaw and hammer while more sophisticated but available tools lie untapped.

Telecommunications Regulatory Landscape

With increased need for telecommunications services in schools comes increased need for investment both in initial installation of equipment and in ongoing connection fees. Schools generally do not have the expertise to plan for efficiencies in design of networks, nor expertise in negotiating their way through the telecommunications regulatory landscape to secure low service charges.

The regulatory issues for telecommunications companies (telephone, cable and wireless) are complex and ever changing. Currently congressional action on preferential rates for schools nationally is pending. Public utility commissions across the nation are beginning to follow Washington's lead and move toward a more competitive marketplace. The challenge before the education community is to become a market force through increased understanding of the issues, aggregation of buying power, business/education partnerships and strong negotiations from an informed vantage point. In addition, education technology leaders should serve as advocates for education in this arena.

The power of technology for schools is in its ability to transform schools into learning environments which match the new state learning goals by bringing resources and innovations to the learner's desktop.

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The Center for the Improvement of Student Learning

The technology section at the Office of Superintendent of Public Instruction has worked closely with the Center for the Improvement of Student Learning, with a telecommunications supervisor assigned half-time to the Center. Collaboration includes:

- joint design and production of the video "Educational Restructuring: Glimpses of the Future;"
- purchase and installation of the Internet hubs across the state by the technology section to support an educational communications network which is critical to the Center's work;
- installation and operation of a "gopher server" at OSPI on the network which serves as a hub for electronic communication with educators, parents and community members;
- implementation of eight on-line curriculum and instruction projects which serve as innovative models and testbeds for the Center; and
- design and installation of the Washington Interactive Television (WIT) system which is used by the Center for interactive videoconferencing with others around the state.

Collaboration between the OSPI technology section and the Center for the Improvement of Student Learning will continue as the Internet system connects more and more educators and parents, the on-line curriculum projects are fully implemented and video production on exemplary models continues.

Collaboration between the technology section and the Center will continue as the Internet system connects more and more educators and parents, the on-line curriculum projects are fully implemented and video production on exemplary models continues.

Goals 2000 Initiative

Since technology is an integral part of the Goals 2000 Act, the technology section at the Office of Superintendent of Public Instruction and the Goals 2000 office plan to work in partnership. A member of the Education Technology Advisory Committee will be appointed to the Goals 2000 Committee and ETAC has offered to serve in an advisory capacity to that Committee.

The plan requires that Goals 2000 initiatives integrate technology into state plans. The Washington plan, recently approved by the U.S. Department of Education, included four major initiatives in technology:

- Public, education and business/industry recognition of and support for technology in education;
- Removal of regulatory, constitutional or statutory barriers which inhibit integration of technology in schools;
- Improvement of student learning through technology-based instructional strategies; and
- Increased electronic access to information by students, educators, parents and community members.

The emphasis on improving student learning through technology and telecommunications in the Goals 2000 legislation clearly supports that same emphasis by Washington State Legislators in the 1993 Education Reform Act.

The major technology initiative funded through these federal dollars is a public awareness initiative scheduled to be launched in the spring of 1995. As Goals 2000 funds are granted to school districts, recipients will be asked to include plans for the integration of technology and telecommunications to support their school improvement efforts.

School-to-Work Transition

Technology will play an important role in school-to-work transition. In addition to the obvious use of technology in the contemporary workplace, technology and telecommunications may be the vehicle through which students in rural areas connect with business and industry for their work experiences.

The Education Technology Advisory Committee does have a member of the Workforce Training and Education Coordinating Board serving as a member. Over the past year the technology section has facilitated the development of several grant proposals for technology infrastructure. Each of those included economic development components and school-to-work features.

Student Learning Improvement Grants

Technology focuses were evident in 644 of the 1800 Student Learning Improvement Grant applications approved by OSPI in June/July of 1994. There is no requirement for inclusion of technology in this program so the conclusion drawn is that local educators recognize the potential technology brings to school improvement through planning and staff development efforts.

Another connection between technology initiatives and this grant program is the potential use of the staff development classes offered through the Educational Technology Support Centers in the educational service districts.

Technology and telecommunications may be the vehicle through which students in rural areas connect with business and industry for their work experiences.

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The Gaps...
The Costs...

Despite the pioneering efforts in this state, there is much to be done. Washington State must ensure that common school students are achieving at world-class standards and that they are prepared to be productive members of the workforce.

The Education Technology Advisory Committee identified gaps in the education system which are preventing schools from providing the learning opportunities necessary for students to reach the technology vision.

The committee then identified the cost of implementing that vision at the classroom, building and district levels. The recommendations in this plan do not reflect the magnitude of the costs identified in this section. This is partially due to the recognition that money is only part of the solution and that significant change must accompany the deployment of technology to maximize the investment.

While the recommendations in this plan take an incremental approach toward implementation, the figures detailed in this section do reflect the true costs districts are facing in retooling schools.
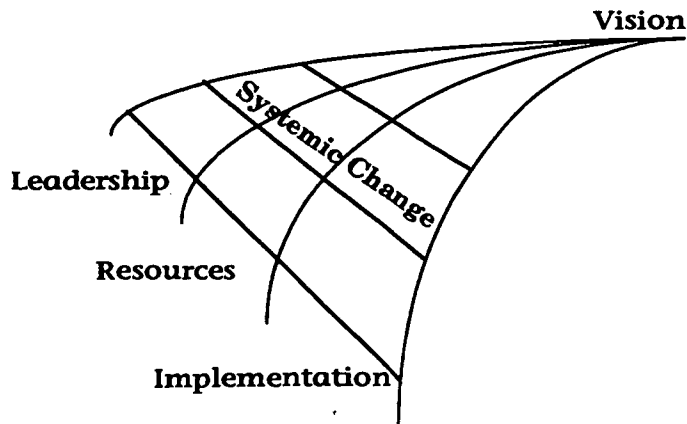
Vision

Systemic Change

Leadership

Resources

Implementation

Leadership Gaps

The many entities which directly and indirectly impact K-12 education have neither a common vision for technology nor an agreed upon definition for equity with regard to technology. Closing this gap could align limited resources to help schools move forward with improving student learning as the driver for technology use.

There is a need for increased public understanding of the role and value of technology in schools. State regulations should be reviewed to ensure that schools are not facing unnecessary barriers. The state should provide coordination in protocols, standards, application of best instructional practices and benchmarks for planning and resource allocation as well as provide appropriate regulatory advantages for K-12 education. Closing these gaps help address issues such as equity, connectivity options, flexibility and smart planning, while maintaining local decision making and encouraging partnerships.

Resource Gaps

Lack of time and personnel are human resource gaps which inhibit quality planning, implementation, operation and evaluation of technology in schools. Staff development programs which truly meet the specific technology needs of students, educators and/or administrators are difficult to find. The lack of accessible information regarding best practices, exemplary programs, research and general information prevents educators from leveraging each other's successes.

The lack of equitable, universal access to equipment, technology-based instructional materials and on-line information is a barrier to reaching the vision. Today's school buildings are not "ready" to utilize technology (e.g., power, phone lines, wiring) and there is a lack of planning, budgeting and funding for support, maintenance and upgrading of equipment.

Implementation Gaps

The difficulty of schools in sustaining a long-term commitment to the implementation of technology is due, in part, to multiple priorities. Truly taking advantage of the technology requires real change in the way the business of education is conducted. Systemic change which impacts all children takes ongoing planning, sustained commitment to implementation across the curriculum, ongoing training efforts, continued upgrading and maintenance of equipment, ongoing assessment and evaluation and buy-in from all stakeholders. The lack of such a systemic approach is a major gap.

Framework for Bridging the Gaps

The identification of these gaps provides the basis for the recommendations in this state plan.

"The twelve recommendations in this plan provide a blueprint for bridging these leadership, resource and implementation gaps."

Education Technology Advisory Committee

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Bridging the Gaps...
Scenarios and Potential Costs:
Technology and Best Practices at Work in the Classroom

Imagine the Community Connections...

As tired as Mona is from last night's tensions at home, she couldn't miss Tuesday, the only day her elementary school keeps the computer lab open for community members young and old.

During the regular school day Mona often stays in at recess with her friend Alisa to practice her math. High wire Logic software lets her sort shapes according to patterns and colors, reinforcing her good problem-solving skills. After school she joins students and community members of all ages in the computer lab. This afternoon she is working on a school project which uses Word Weaver for original composition. She opens her file and reads the text she has written so far. She adds a final note to the story about the drive-by shooting in her neighborhood last month.

Now she is ready to add sound and images to her story. She searches the image database and finds pictures of guns, houses, cars and people. She chooses some to import and adds them to the story. Then she cruises around the room and asks a classmate, her brother and a neighbor if they would say a few words into the microphone on her computer about Michael, who died in the shooting. She digitizes their voices as they share their thoughts. She adds those sounds as well as a siren she found in a sound database and scans in Michael's image from a school photo a friend had. Tomorrow she will share this story with her class but tonight many community members stop by her computer to read, listen and look at her story about Michael. For now she is glad she has a safe place to be until her brother picks her up at eight.

or... Influencing Public Policy at Sixteen

The state legislator holds a report in hand while five students stand before her, a computer projecting the image of a spreadsheet onto a large screen. "You say that you can document declining water quality?" The spokesperson for the project team nods his head. "We collected and analyzed stream samples over a six-month period. Here are the results."

The screen flashes a brightly colored graph which dramatically illustrates the research findings. "Well, young man, what recommendations do you have for us?" The student smiles warmly. "I'm glad you asked me that, Senator. We have several legislative proposals which we developed with the guidance of our teacher, in cooperation with representatives from the Department of Ecology, our community and ACE Paper Products, our partner from the

> "It is essential that we find ways to reach out to impoverished families and create new educational opportunities.
>
> Technology isn't the 'cure all' but it has enormous potential, a good track record, and an ability to motivate and interest students of all ages in an electronic and nonthreatening environment."
>
> Jay Franco, Teacher
> Seattle School District

business community. Many of these ideas have already been tested in other places, as we learned while researching on the Information Highway."

Thanks to powerfully networked information resources, students at Next Century High take a great deal of responsibility for their own learning. In keeping with state learning goals, teachers have been challenging students to apply problem-solving skills to real issues drawn from their own community, from the state of Washington, the nation and the world at large. Students divide their time between the learning of skills, the acquiring of knowledge and the solving of problems.

While teachers continue to play an important role as coaches and guides—making sure that students connect with the appropriate resources, in this school one rarely sees teachers standing in front of a class lecturing. Much of the learning takes place in groups as work teams of students employ new technologies to study questions and produce reports and projects.

The Cost...

From a school's perspective, translating the vision and the seven essential learnings for technology into action is extremely challenging. The intent of this spreadsheet is not to dictate the specific configuration for Washington classrooms, but rather to provide decision makers with an idea of the scope of investment required to adequately retool schools.

A classroom using best practices might contain...

Learning Purpose	Technology	No.	Unit	Total
Portable device for writing, calculating, storing, retrieving, processing, sending, receiving.	Productivity Devices 15 Students, 1 Teacher	16	$ 1,000	$ 16,000
Electronic notebook, pencil, wordprocessor, database and computer in one. Ratio 2:1 (Student:Device) so they work in pairs or teams and check it out when they need it at home. Teacher uses his/hers for same purposes as well as for classroom assessment.				
Productivity/Presenting, Managing, Desktop Publishing, Hypermedia, Communicating On a 4:1 (student:computer) ratio the work stations are located in the classroom enabling students to "plug-in" their personal devices for team work, collaborative projects, computing which requires higher level of machines, video, and/or connectivity with others locally and globally.	Work Stations with software, printer and network connection. 8 Students 1 Teacher	9	$ 2,600	$23,400
Video/Communication Media The projection device enables the entire class to view the same computer/video image. A combination of imaging devices for interacting with as well as productivity by learners: possibly including video camera(s), still camera(s), telecommunications device (phones), VCR(s), monitors, videdisc player(s), CD ROM player(s), and media (blank and instructional/ curricular).	Classroom Video/Media		$ 4,000	$ 4,000
Subtotal for Classroom Note: networking included in building budget				$ 43,400
Technical Support/Operation (10%)				$ 4,340
Staff Development		–		$ 1,000
Replacement costs—Six-year cycle	One-sixth of total		–	$ 7,223
Total for Each Classroom		–	–	$ 55,963

GAPS... THE COSTS...   1994 WASHINGTON STATE TECHNOLOGY PLAN FOR K-12 COMMON SCHOOLS

Bridging the Gaps...
Scenarios and Potential Costs:
Technology and Best Practices at Work in the School Building

Come on in....

The media center is buzzing with activity as research teams gather to work with collections of printed materials and artifacts of one kind or another. The media center's physical collection has changed to emphasize materials which might suffer from digitization, so there are many art prints, atlases and beautiful illustrations. Non-fiction books which previously became rapidly dated have been replaced by electronic media such as CD-ROM disks and access to the Information Highway, services which are served out across the school network into all classrooms. The media center has become a gathering place for teams to plan and conduct research. It also retains a fine hard cover collection of fiction, poetry and literature.

In one-half of the media center, the media specialist, Mr. Hammond, is showing a class of seventh graders how to employ the KWIC (keyword in context) function of the search software they will be employing as they conduct research on the Information Highway. The media specialist has primary responsibility for introducing students to the increasingly powerful research and information problem-solving resources available over the school and district network. He also provides instruction in how to make use of the desktop video editing available in the media center so that students may take their video footage and make use of it in projects. Utilization of the media center has tripled since installation of the district network and the approval of an information skills curriculum which is blended into the curriculum guides of all the other disciplines. Classroom teachers have forged a partnership with the media specialists to support extensive student problem-solving.

Check out what students are doing NOW...

Educators, students and parents have all discovered the power of electronic mail, portfolios and access to on-line resources. Just this year the school building has installed dial-up modems which allow students, parents and community members to electronically connect to the school from their homes and from access points in the local library. Students can now do their homework on-line while accessing all the resources they would have in school.

It's a school night and two drama students, Mario and Lee, have met at the local library to complete the staging of a play. They use

"Our school libraries provide the vital link between our learners and the information highway.

Librarians are key to leadership and staff development in integrating appropriate information and educational technologies in our school curriculum."

Barb Bumgardner
Library Media Specialist
Shoreline School District

a computer station in the library which is placed there by the school to electronically connect and pull up their files on the staging. They peruse documents on-line to get a sense of the historical context of the play. Once they identify the period, they gather pictures of the components of the set, using the scanner to digitize images, organizing the images and related text in a desktop publishing program.

As they work they send an e-mail message to their teacher who happens to be on-line from home and answers them immediately. Once they finish the set for the play they save the file to be published tomorrow at school. Mario considers this assignment to be one of his best this year so he proceeds to place it in his electronic portfolio, noting his reasons for judging this to be of quality work and placing those thoughts along with the document in the portfolio. All of these files are readily available only to the student, his/her parents or guardians and instructors for review and comments.

The Cost...

From a school's perspective, translating the vision and the seven essential learnings for technology into action is extremely challenging. The intent of this spreadsheet is not to dictate the specific configuration for Washington schools, but rather to provide decision makers with an idea of the scope of investment required to adequately retool schools.

A building using best practices might contain...

Learning Purpose	Technology	No	Unit	Total
Library Media Center The library media center serves as the networking hub for the building. The center has a video distribution system through the network which allows classrooms to access videodiscs and video tapes from the center. It also has a CD-ROM tower and a circulation system that are accessible from the classrooms. This allows the learner to access resources anywhere in the building.	14 Work Stations/ 2 Staff Stations Equipment for on-line and off-line access to video, voice, text, images and data in organized process (e.g., circulation system, computers, disc players, CD-ROM tower/players, VCRs, monitors, printers, periodical station, circulation station/wand, editing suite (1 per every six-eight buildings), etc.	16	$ 2,200	$ 35,200 $ 50,000
Building Network The building is networked for data and video and wired for adequate electrical capacity.	Network File Servers, routers, tape backup, uninterrupted power supply, hubs, connections (panels/wires/ labor), video distribution system, electricity, voice integration, video production studio/head in.			$244,400
Administration Stations	Administration/Support Stations with printers, software and networked. 7 stations	7		$ 21,400
Subtotal on Equipment Network Administration/Support Staff Development Replacement costs—Six-year cycle	Support for the File Server One-sixth of total equipment/ software cost			$351,000 $ 37,240 $ 7,500 $ 58,500
Total for Each Building	Note: Average varies with student populations and level of use.	-	-	$454,240

Bridging the Gaps...
Scenarios and Potential Costs:
Technology and Best Practices at Work across the School District

Join in....

The class of sophomores is gathered in research teams, each of which is clustered around a computer linking the group to the Information Highway. The class is a combined social studies/science section which explores scientific questions with dramatic societal impact. The students are participating in a public policy simulation and debate on federal guidelines to restrict automobile emissions, for which each group is researching a particular position assigned by the teacher. Having already reviewed video clips of adult citizens actively debating their issue on a videodisc, they are now collecting evidence to support their position by scanning the voluminous electronic archives available through the school district's connection to the Information Highway.

As one group enters its search strategy, the monitor's screen fills up with a long list of articles, documents, data files, pictures and video clips which members down-load onto the hard drive for later culling and synthesizing. In less than ten minutes they have accumulated a stack of material which would extend to the ceiling of the classroom if printed in hard copy. By the next morning they had sorted through that electronic mountain until they found the most compelling and persuasive material. Tomorrow's class will be their opportunity to paste together their findings in a multi-media presentation which will include substantial blocks of their own analysis and writing.

A second team is sifting through responses to bulletin board messages they posted earlier in the week. Several hundred messages have been returned by key people in the automobile business, most of which are extremely helpful to the team as they begin to craft their presentation. A third team gathers around their monitor to interview a lobbyist from one of Washington's environmental groups. The two-way videoconference is saved by the computer for later cutting and pasting into the group's presentation.

A fourth team explores information resources related to emissions resident in the school media center on a CD-ROM tower, magazine articles and newspapers, for example, which are served out to each classroom over the school-wide network. They have been taught many of their information problem-solving skills by the school's media specialist who has shown great leadership in developing the media center as a hub for the information services of the school community.

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"We would like teachers in this state to consider themselves lifelong learners. Teachers should think of themselves as the chief learner in the classroom, with students as learner apprentices."

Bob Hughes
School Board Member
Lake Washington
School District

A fifth team views footage from an interview taped the day before at one of the local automobile agencies, during which the manager was questioned about various proposals to limit emissions. They are editing the footage for use with their report. The teacher of this class moves from group to group, questioning, supporting and suggesting. This being the fifth such policy simulation of the school year, the students have "learned the ropes" and are capable of performing their research responsibilities with considerable autonomy.

The teacher recalls with a smile the three years and two summers of classes during which he "learned the ropes" himself by trying out all of the software and the problem-solving strategies with teams of other staff members, many of whom had been skeptical of technology until they saw its practical applications and were provided thorough training in its uses.

The Cost...

From a school's perspective, translating the vision and the seven essential learnings for technology into action is extremely challenging. The intent of this spreadsheet is not to dictate the specific configuration for Washington school districts, but rather to provide decision makers with an idea of the scope of investment required to adequately retool schools.

A school district using best practices might contain....

Purpose	Technology	No.	Unit	Total
District Office Fiscal and Student Record Management	Work Stations, printers, software and phones			$ 32,500
Wide Area Network	WAN Equipment including integration of voice and data, and the transmission of voice, video and data between buildings and into a state backbone with gateways beyond.			$ 116,940
Subtotal				$ 149,440
Technology/Network Coordination				$ 55,000
Staff Development				$ 5,000
Replacement costs—Six-year cycle				$ 24,700
Total for District Level Expenditures				$ 234,140

Note: This spreadsheet is configured for a district of approximately 3,000 students in six buildings plus the district offices.

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Bridging the Gaps...

Recommendations with Accountability

With the technology agenda established for K-12 education through this Washington State Technology Plan for K-12 Commons Schools, it will be necessary for policymakers in government, education, business, labor and community to work together to successfully implement the plan.

The recommendations on the following pages serve to bridge the gap between the vision articulated in this plan and the current status of technology and telecommunications in K-12 schools. They represent a blueprint for the state to follow.

Each recommendation has associated results which will be carefully monitored from both an assessment and an evaluative perspective. The assessment to assure continuous quality improvement along the way and the evaluative to assure accountability to state legislators.

As technology, media and telecommunications are integrated into the learning process, the performance-based assessment system currently under design by the Commission on Student Learning will be the vehicle for assessing the effectiveness of the tools. Attaining the seven essential learnings for technology listed previously in this document is necessary for all students if they are to achieve the new state learning goals.

As the state plan is implemented every effort will be made to ensure efficiencies of cost. For example, group buys of products and services will be accomplished, expertise will be shared and districts will be asked to plan to sustain state investments in subsequent years through reprioritization of existing funds.

The combination of recommendations serve as a strong bridge to the technology vision for Washington State K-12 students.

Leadership Goals...

• General public consensus is that technology and telecommunications are critical components of a sound K-12 education.

• The role of technology and telecommunications in learning is considered as state education reform and restructuring initiatives are launched.

• State policymakers and stakeholders commit to appropriate and necessary long-term support and funding of the recommendations in this plan, holding the educational community accountable for continuous improvement in learning.

• Constitutional and statutory law and associated rules and regulations enable and empower schools to integrate technology and telecommunications into the learning process.

Resource Goals...

• All K-12 learners have equitable, universal access to technology tools and telecommunications services to help them reach the state learning goals.

• A telecommunications infrastructure is designed and deployed to provide communities with civic, health, social and educational access to resources/services.

• An educational funding system from the state assures basic technology and telecommunications access for equity of educational opportunity for all K-12 learners in the common school system.

• All school staff are knowledgeable about, competent and confident in, and committed to using technology and telecommunications to enhance learning.

Implementation Goals...

• All school districts are implementing a technology plan, tying technology to improving student learning and supporting assessment as required in the state's essential academic learning requirements.

• Supportive school structures encourage learners and educators to use technology and telecommunications to enhance the learning process by providing leadership in planning, timely training and technical support, and continuous support for new models to integrate technology.

The recommendations in this state plan provide policymakers with a blueprint as to how to attain these goals through a systemic approach to integrating technology, media and telecommunications into the K-12 common school system.

"A systems approach is required to take full advantage of the learning possibilities technology brings to education.

That means that technology should not be an add-on, but rather an integral part of the way learning is accomplished at the student, educator, building, district, community and state levels."

Education Technology Advisory Committee

Bridging the Leadership Gaps

Recommendation #1

Technology in Education Initiatives

Gap

Technology and telecommunications are catalysts and tools for education reform, yet state technology planning is not closely aligned with education reform efforts in Washington State. Just as Boeing used a new paradigm in designing and testing all facets of the new Boeing 777 strictly through digital modeling on the computer, the K-12 education system must effectively apply technology and telecommunications to leverage limited resources and maximize results in preparing students for their futures. Telecommunications is a relatively new phenomenon in K-12 education for the majority of school districts. As such it will be important that information policies be carefully developed, adopted and implemented to ensure students', families' and staff's rights.

Recommendation #1

It is recommended that OSPI, the Commission on Student Learning, the school-to-work initiatives and the Goals 2000 Committee consider technological implications and opportunities as Washington's new education system is established. Furthermore, that the statewide Education Technology Advisory Committee serve in an advisory capacity in all matters pertaining to educational technology and information policymaking in K-12 for those groups; and that ETAC serve as an advocate for education in the telecommunications regulatory process.

Background

The National Telecommunications Infrastructure Administration identifies telecommunications as "a vital component of the U.S. economy and, indeed, of the nation's way of life." In this state of high technology industries it is particularly important that technology and telecommunications be factored into the development of state essential academic learning requirements and

"If we want to create a broad based, well-educated workforce that has a capacity to use information to keep our economy growing, then we need to hook this future workforce into the NII (National Information Infrastructure) early."

Secretary Riley
U.S. Department of Education
(May 25, 1994)

its performance-based assessment system. To do so will require the careful alignment of the state technology plan with the work of the Commission on Student Learning, school-to-work initiatives and the Goals 2000 Committee. And it will require that educators assume an informed and aggressive role in the determination of telecommunications policy and regulation.

Expected Results

This recommendation will increase awareness among K-12 education decision makers about technology and the role it should play in education reform in Washington State. Having one committee serve in an advisory capacity to the groups identified above would serve to coordinate progress toward: the effective use of technology and telecommunications in all facets of educational restructuring and reform (including the performance-based assessment system and the essential academic learning requirements); increased academic achievement through successful integration of technology and telecommunications in schools; and advocacy for K-12 education in telecommunications regulatory decision-making processes.

Who/What

The Superintendent of Public Instruction will continue working with and supporting the Education Technology Advisory Committee, establishing linkages among that committee and the Commission on Student Learning, OSPI, school-to-work initiatives and the Goals 2000 Committee to determine committee action.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Advisory Committee and Subcommittee Travel/ Videoconferencing	$ 11,000	$ 11,000	$ 22,000
Consultants/Speakers	10,000	10,000	20,000
Publications/Communications	3,000	4,000	7,000
Subtotal	$ 24,000	$ 25,000	$ 49,000

	FY '95-'96	FY '97-'98	FY '99-2000
Totals Biennial Budget Requests:	$ 49,000	$ 40,000	$ 20,000

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Bridging the Leadership Gaps
Recommendation #2

Partnerships, Alliances and Public Awareness

Gap
In general, stakeholders for K-12 education do not have a common understanding of the potential technology and telecommunications hold for improving learning and for students' future economic viability. With the accelerating rate of emerging technologies, increasing levels of funding available from the federal government for the National Information Infrastructure and the rapidly expanding telecommunications market, it is imperative that Washington State be poised to leverage these "windows of opportunity."

Recommendation #2
It is recommended that the Legislature fund OSPI to launch alliances, partnerships and public awareness initiatives which gain broad-based public and private understanding, support and funding for the integration of technology and telecommunications in K-12 education to provide students with high quality, relevant learning experiences.

Background
The Department of Transportation is recommending "telecommuting" as a partial solution to transportation gridlock and environmental concerns from vehicle emissions. According to the American Electronics Association, today's competitive marketplace requires companies to constantly improve the product and speed production by tapping the full range of worker skills and talents. "Workers need to know how to use new technology, analyze and fix complex problems, and improve production processes." Similarly, education reform through technology and telecommunications represents a major shift from traditional learning techniques to knowledge-based, relevant learning processes.

Today citizens, students, community members and policymakers simply do not have sufficient information to make intelligent decisions about technology in schools. As communities become more active in

In support of linking the nation's classrooms to the Information Highway...

"This is my challenge to you... to form a coalition and make it an effective voice for the children of America."

Federal Communications Commission (FCC) Chairman Reed Hundt (1994)

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Scenario...

After becoming aware of the role technology must play in today's schools, community X partnered with their local K-12 schools to fund a local technology plan which met K-12 needs during the school day; established the school as a community center at night for adult retraining, desktop publishing, resume writing, library research and civic needs of all community members; and electronically connected local citizens to a city bulletin board system for civic discussions, information on issues, a calendar of local events, and promotion of local businesses.

local decision making, this awareness will be critical. And, through this awareness, the state will be better positioned to leverage and align existing as well as new resources among stakeholders (e.g., the U.S. Department of Commerce's $64 million grant program for telecommunications infrastructure in 1995-96).

Expected Results

This recommendation will result in: an increased level of understanding among all stakeholders that technology and telecommunications can and should play a vital role in the education of K-12 students and in the community as a whole; and new capacity to leverage private and public funds at the federal, state and local levels in coalitions and alliances which benefit the whole community and bring relevance to K-12 learning.

Who/What

The Superintendent of Public Instruction will build coalitions to apply for and secure funding for technology in K-12 schools; and work with all stakeholders on public awareness initiatives which highlight the critical role of technology and telecommunications in education reform.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Product Production/ Duplication and Dissemination	$ 125,000	$ 175,000	$ 300,000
Matching funds for Federal/ Private and/or State Grants	0	300,000	300,000
Subtotal	$ 125,000	$ 475,000	$ 600,000

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$ 600,000	$ 600,000	$ 400,000

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Bridging the Leadership Gaps
Recommendation #3

Affordable Telecom- munications Access for Schools

Gap

With increased need for telecommunications services in schools comes increased need for investment both in initial installation of equipment and in ongoing connection fees. Schools generally do not have the expertise to plan for efficiencies in design of networks nor expertise in negotiating their way through the telecommunications regulatory landscape to secure low service charges. School budgets need to be leveraged through low telecommunications rates for schools.

Recommendation #3

It is recommended that the state assist schools in securing affordable access to telecommunications services and equipment for K-12 education through:

1. Legislative funds to support OSPI, in cooperation with the Department of Information Services and the educational service districts, to aggregate buying among school districts;
2. Legislative funding to support OSPI and the educational service districts in launching and sustaining a program to increase the ability of school districts to secure affordable telecommunications access through careful planning and competitive advantage;
3. Legislative funds for a grant program to develop prototypes and exemplary models which provide low telecommunications rates to local schools through innovative school/community/business partnerships;
4. Legislative action to modify the tax incentive program to high tech industry in Washington State to include businesses which support the implementation of this state technology plan; and
5. Legislative action to ensure educational channel capacity across existing cable systems and support in program production be made available to local K-12 school districts.

Background

Washington State leads the nation in moving toward deregulation of telecommunications providers and promotion of a competitive

"By fostering fair and open competition, the Utilities and Transportation Commission is optimistic that schools will benefit from the improvements in quality, service and price...

This means that school administrators will have to be informed consumers so that students receive the services they need at prices that the schools can afford."

Sharon Nelson
Chair, Washington State Utilities and Transportation Commission

Districts X, Y, and Z in eastern Washington have formed a consortium in partnership with their communities to negotiate with Phone Company ZZZ to bring a fiber ring into that region of the state. The schools act as "anchors" with the community leveraging the electronic connections through new "telecommuting" businesses, new library services to homes and electronic access to government information.

Awareness brought action in Community W. The city council is working with the local school districts, county government, local businesses, phone companies and cable companies to build a system of inter-connected electronic linkages that meets the communication needs of all, with the schools as anchors on the system, customers who pay affordable rates in return for volume and predictability of service needs.

environment with rate-based costs for services. Ultimately school districts should be able to identify their needs and secure affordable telecommunications services to meet those needs through savvy negotiations in that competitive environment. As the National Information Infrastructure is deployed it is clear that all levels of the community should be tapped to leverage resources and move toward universal service for all citizens. These recommendations are interim steps toward moving schools in this direction, and are clearly needed to provide low-cost access to schools in this climate of regulatory change.

Expected Results

With low-cost telecommunications access for schools will come increased communication between the school, the home and the community; increased access to up-to-date educational resources for students and educators; increased student access to "the real world" which will increase the relevancy of learning and build strong school-to-work transitions; and stronger ties with the community. This translates into a leveraging of resources for the benefit of all.

Who/What

The State Legislature will consider enacting legislation to provide tax incentives to Washington businesses for their efforts in implementing this plan; and to allow school districts full access to at least one cable channel and production on existing community systems. The legislature will fund OSPI and the educational service districts to: establish an education program on telecommunications for school districts, in cooperation with telecommunications providers; to work with the Department of Information Services to aggregate buying power for school district telecommunications products and services; and to establish a grant program to establish community prototypes which result in low telecommunications costs for schools.

Budget

Budget Category	FY '95	FY '96	FY '95-'97
Education/Coordination Initiatives for Schools	$ 40,000	$ 45,000	$ 85,000
Forums/Workshops/Materials	70,000	60,000	130,000
Tax Incentives Review Process	2,500	2,500	5,000
Grants for Community Prototypes			
Coordination/Selection	89,700	110,200	199,900
Grants to Communities	400,000	1,400,000	1,800,000
Cable Access/Program Production			
Schools-Cable Alliance	200,000	200,000	400,000
Subtotal	$ 802,200	$1,817,700	$2,619,900

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$2,619,900	$2,500,000	$1,000,000

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Bridging the Leadership Gaps
Recommendation #4

State Policies and Funding Strategies to Reflect Technology

Gap

In just the last two years more than one industry giant has been required to downsize and significantly change their corporate structure in order to survive economically. That meant doing business in entirely new ways. These same realities have greatly contributed to the impetus for education reform for K-12 in Washington State. Yet, current education funding mechanisms do not reflect technological requirements (e.g., ongoing staff development needs, technical/networking support staff, maintenance, operation and upgrading of equipment and networks, district coordination, technical and programmatic support in school buildings).

Recommendation #4

It is recommended that all development, adoption and/or revision of policies and procedures for the common school system by the State Legislature, the State Board of Education, the Commission on Student Learning and OSPI reflect current technological requirements for learning.

Background

Business and industry consider the initial investment in hardware as approximately one-fifth the cost of technology implementation. The remaining four-fifths of their costs lie in ongoing training, software and hardware maintenance and upgrades as well as technical support to ensure maximum use of the investment. If schools are to effectively integrate technology and telecommunications into the learning process and sustain that investment, they, too, must include these sustainability factors.

"Funding restrictions must change to allow communities the flexibility to support their schools in providing technology as a learning tool."

Rick Feutz
Kent School District

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Results at the district level:

The Commission on Student Learning has integrated technology into the Essential Academic Learning Requirements. As a direct result, the budget director for District Y includes the growth, operation, associated staff development and sustainability of technology for learning as line items in the district budget for basic education.

Expected Results

The Joint Select Committee on Education Restructuring and other education policymakers will consider technological implications for schools during their review of the current statutes, educational policies and rules/regulations for Washington State. And school districts will consider factoring in technology and telecommunications costs as line items when they build their general operating budgets, including: initial investments; related staff development and instructional materials; operation, maintenance; upgrades; and ongoing technical and programmatic support.

Who/What

The Education Technology Advisory Committee and OSPI will recommend to the Joint Select Committee on Education Restructuring and other education policymakers that technological implications be considered in education funding formulas.

Budget Request

No anticipated fiscal impact.

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$0	$0	$0

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Bridging the Leadership Gaps

Recommendation #5

Review of Levy and Bond Regulations on Technology

Gap

Current constitutional and statutory language defining, governing and administering the use of school levy and bond funds for technology and telecommunications acts as a barrier to effective use in schools.

Recommendation #5

It is recommended that the State Legislature enact legislation to revise current constitutional and statutory language regarding bonds and levies to give school districts increased flexibility to effectively deploy, operate, upgrade and maintain technology and telecommunications in the K-12 education system.

Recommendations include:

1. Striking the clause prohibiting the use of bond/levy funds for the replacement of equipment.

2. Adding "technological modernization of learning sites" as an allowable expenditure under the six-year modernization levy.

3. Adding "technology related investments" to the expenditure categories allowable under bonds and levies. Defining technology related investments to include the purchase, upgrade and installation of: electronic and optical equipment such as computers, CD-ROM players, videodisc players, electron microscopes; associated wiring, cabling, servers, routers, modems, networks and other peripherals; software and other technology-related media; associated installation costs; initial training of staff; and other items incidental to the deployment of the investment.

"Schools need the flexibility to use bond and levy dollars not only for equipment but for related investments which ensure the efficient and effective installation, operation and use of the technologies."

John Newsom
Technology Coordinator
Bellevue School District

The $5 million bond District X just passed for technology learning tools is a great "return on investment" in terms of student learning.

Due to recent changes in state regulations, this project has the flexibility to include all the components for success...

Equipment purchases are tied to specific learning results, with teachers, paraprofessionals, students and parents in on the planning. And everyone is trained on the machines they will use, with the software carefully selected to support the curriculum.

Strong technical support means that when a machine doesn't turn on or e-mail won't work teachers have a technician to call who is there immediately, and a curriculum specialist for daily support in using the technology to support learning.

A true systems approach!

Background

Deployment of technology and telecommunications equipment in schools must be aligned with a comprehensive strategy to ensure maximum positive effect on learning and sustainability of this investment. Support strategies must include associated staff development; technical support; ongoing operation, maintenance and upgrading of hardware, software and technology-related instructional materials; and ongoing coordination and leadership in this area. State statutes and policies should encourage this comprehensive approach.

Expected Results

These recommended changes would increase the flexibility of the school district to allocate funds toward a comprehensive approach to the use of technology in schools, thus ensuring maximum gain from the state investment.

Who/What

The State Legislature will consider enacting legislation which succinctly establishes new definitions for technology, capital projects funds and modernization, adding flexibility and clarification to existing statutory language on bonds and levies as it pertains to technology and telecommunications investments.

Budget Request

No anticipated fiscal impact.

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$0	$0	$0

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Bridging the Resource Gaps

Recommendation #6

Gap

It is the paramount duty of the state of Washington to provide equitable educational opportunities for all students in the common school system. Yet current student access to technology and telecommunications for learning largely depends on whether or not their community has the economic base and the collective will to support bonds and levies for this purpose.

Recommendation #6

It is recommended that the Legislature establish and fund an ongoing technology grant program through OSPI to grant funds to school districts to equitably support all students' learning through technology and telecommunications. Prior to receiving such grants, school districts would be required to develop, implement and assess technology plans focused on student learning.

Background

Children entering a typical elementary school in Washington State will not use technology or telecommunications as a learning tool integral to their education. The public and business and industry in particular clearly recognize that technology and telecommunications play a significant role in today's environmental, social and health services, economic, civic and entertainment segments of American life. Yet, in general, that acceptance has not yet translated into the recognition that those same tools must be used to improve and enhance learning and are, in fact, necessary to preparing our youngsters for their futures.

Research clearly demonstrates that, combined with appropriate teaching methods, technology and telecommunications do increase academic achievement among the K-12 population. In fact, the use of those tools enables educators and parents to provide a more relevant, engaging educational program which can be designed to

"Educational decision makers must carefully analyze the current use of school funds and reprioritize existing dollars to reflect the changing needs in education.

So many of the things we are trying to do in schools today could be accomplished through technology, but that will take new money for retrofitting our school facilities."

Thelma Jackson
School Board Member
North Thurston School District

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meet the learning needs of all children and youth in the common school system.

Eduardo drags an icon across his desktop computer and smiles. With a simple mouse-click he sends a folder of duplicating materials down the hall to be centrally copied, saving himself the need to print or walk. Next he transfers a list of the week's assignments to e-mail, clicks on group addresses to match each class and then sends the batch out to all of his students on an electronic bulletin board available to callers from outside of school such as parents or absent students. He smiles and turns to a student waiting to discuss a recent paper.

Expected Results

This recommendation will translate into tremendous progress toward equity of educational opportunity to learn for Washington State students. The return on investment will be forthcoming in the form of increased student attainment of the four state learning goals; increased relevancy of learning which translates into school-to-work opportunities, individual student stewardship toward community and engagement, on-task learning; and increased economic viability of this state to sustain and grow a knowledge-based economy in a global competitive market.

Who/What

The Superintendent of Public Instruction will establish a grant program for school districts that allocates funds for educational technology within a state framework which guides school districts toward the use of the tools in support of student attainment of the state learning goals. The next four pages in this document outline that state framework, district requirements and a strategy for allocation of funds.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Planning/Staff Awareness/Prototypes	$ 9,750,000	$ 0	$ 9,750,000
Review Process for District Technology Plans	8,000	4,000	12,000
Connectivity Allocation to School Districts	15,000,000	30,000,000	45,000,000
Allocation to School Districts for Implementation of district technology plan (match required)	15,000,000	30,000,000	45,000,000
Evaluation/Assessment Consultant Contract	50,000	100,000	150,000
OSPI Oversight	85,845	91,845	176,690
Subtotal	$ 39,893,845	$ 60,195,845	$ 100,089,690

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$ 100,089,690	$ 150,000,000	$ 200,000,000

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Details for...

Recommendation #6

Education Technology Grant Program

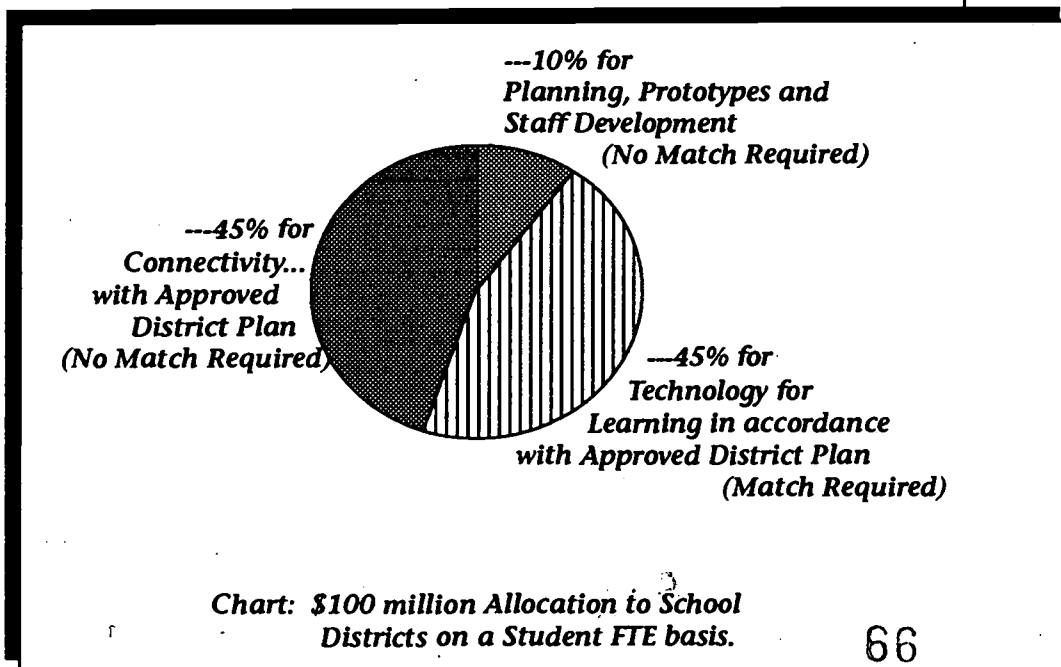The Office of Superintendent of Public Instruction will allocate grant funds of $100 million in the 1995-97 biennium to school districts on a per student FTE (full-time equivalent) basis.

Prior to receipt of implementation dollars, each school district is required to have an approved technology plan on file with OSPI for the 1995-97 biennium which meets the criteria on the following pages. The approval process will include a review by peers under the direction of OSPI in cooperation with the Educational Technology Support Centers. The intent of the review process will be to approve all plans meeting the state criteria and to provide technical assistance for those districts whose plans are not approved in an initial review. The process will be conducted quarterly to review plans submitted by districts in the prior quarter.

"A comprehensive school district technology plan is critical to ensuring that the state technology allocations are wisely invested in the futures of our children."

Education Technology Advisory Committee

The allocation of funds shall be as follows:

---10% for
Planning, Prototypes and
Staff Development
            (No Match Required)

---45% for
Connectivity...
with Approved
District Plan
(No Match Required)

---45% for
Technology for
Learning in accordance
with Approved District Plan
            (Match Required)

Chart: $100 million Allocation to School
Districts on a Student FTE basis.

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The grant program for school districts will be implemented as follows:

1) Up to 10% of the biennial funds will be allocated to school districts in the first year to support technology planning, staff development critical to technology planning and/or research through model programs. No match will be required for these funds. Said plan will incorporate strong building-based decision making in both the development and implementation of the plan within a district framework. OSPI, the Educational Technology Support Centers at the educational service districts and districts with successful track records will work with other school districts to assure a quality technology planning process at the district and building levels, as well as general community awareness.

2) 45% of the funds will be allocated to schools for connectivity on a student FTE basis provided the school district has a state-approved technology plan. No match will be required for these funds. No district meeting the criteria will receive a sum of less than $10,000 in this category. Those districts which have established building-wide networks in at least one-third of their buildings will join a "Peer Coalition for Technology," through which they will be called upon to share their expertise with a district, or districts, not yet at that level of connectivity.

3) 45% of the funds will be allocated to schools to implement their district plans provided that they have been approved by the state and meet the match requirement calculated based on their economic ability to pay. Educational technology funds expended by the district during the 1994-95 school year for technology will be counted in the match requirement for the 1995-97 biennium. No district meeting the criteria in this category will receive a sum of less than $10,000.

4) Districts will be accountable to OSPI for the planning, implementation and evaluation components of this grant program.

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Details on...

Recommendation #6

State Benchmarks for District Technology Plans

A state-approved School District Technology Plan is required before school districts can received 90% of their education technology allocation for 1995-97. The following guidelines will serve as benchmarks in the technology plan approval process.

Each district plan will ensure systemic change in all phases of the planning, implementation and evaluation by:

1. Including representatives from education, the community, the student body, local community colleges and institutions of higher education, libraries, labor, and business and industry on both the school district technology advisory committee and on site councils at the building level;
2. Including an initiative to increase the awareness and involvement of the local public, students, educators, community and business and industry as to the potential technology and telecommunications hold for improving student learning; and
3. Developing the plan around a district/community framework which involves a level of decision making at the building sites.

Each plan will design the technology system around learning by:

4. Integrating the use of technology and telecommunications into the school district's education reform efforts and time lines;
5. Integrating technology across the curriculum, at all grade levels and in all learning centers (e.g., classroom, library media centers, special programs);
6. Including an assessment of the current status of the school district regarding technology and telecommunications (inventory of equipment, peripherals, instructional programs where technology is integrated, staff expertise, assigned personnel, decision-making process for technology, staff development program on technology for learning, networks, wiring, etc.);

"A district plan for technology will ensure policymakers that the state investment will have a real impact on student learning, that districts will plan to sustain the investment and that state standards will be adhered to for purposes of interoperability and connectivity."

Education Technology Advisory Committee

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7. Developing a vision and a strategic framework for equitable and systemic change across the district; and

8. Designing a district infrastructure for connectivity which meets the district learning needs and the state standards; leverages community resources; connects with all library media centers, the local public library and other local schools; and includes a level of community access.

Provide a strong support system to ensure successful implementation by:

9. Including a strong ongoing staff development component which supports all staff in modeling and integrating technology and telecommunications in the learning process and increases administrative productivity; and

10. Including a plan for ongoing program support to enable all staff to systematically integrate technology and telecommunications in the teaching and learning process, including some integration of academics and vocational education.

Build into the plan change, growth and sustainability by:

11. Including a technical and fiscal plan for ongoing support for all technology investments, including careful documentation of all infrastructure installation; adherence to district equipment standards; ongoing repairs, upgrades, maintenance and replacement; and the technical personnel necessary to operate, and maintain and troubleshoot the systems;

12. Including a comprehensive assessment strategy which links to the state performance-based assessment system currently under development. The intent is to gauge the impact of technology and telecommunications on student learning and students' progress toward the achievement of the state learning goals;

13. Including a process for review/adoption of school board policies which address copyright, intellectual freedom, access, privacy, confidentiality and acceptable use of the school district's technology and telecommunications resources by students, educators, staff, parents and community members; and

14. Including a time line for ongoing planning, incremental and prioritized implementation, assessment, evaluation and revision of the plan.

Note: The state and regional education agencies will provide a planning template and technical assistance to districts in support of their technology planning, implementation and assessment efforts.

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Bridging the Resource Gaps
Recommendation #7

Regional Support for Educational Professionals

Gap
The Educational Technology Support Centers, funded through the 1993 Education Reform Act, and the inservice programs through institutions of higher education are not currently able to meet all the educational technology needs of local school districts, particularly in the area of networking and new staff development models supporting the work of the Commission on Student Learning. As the Commission designs the performance-based assessment system it will be critical that new staff development models be designed for specific buildings and specific educators as they implement the work of the Commission in their school buildings and classrooms.

Recommendation #7
It is recommended that the Legislature increase funding to OSPI and the Educational Technology Support Center program in the ESDs to:
1) expand services in networking to meet current demand, and
2) work with institutions of higher education and the Commission on Student Learning in developing and implementing new staff development models which support new education reform initiatives.

Background
Currently the Educational Technology Support Centers and institutions of higher education are providing quality inservice classes on educational technology. These classes build a basic awareness of technology and telecommunications applications to learning. What educators need beyond that are staff development programs designed to meet the specific learning goals of a building staff, taking into account the equipment and resources available in the building and the instructional approaches and curricular focuses of that building. When staff are guided through a program designed to improve learning for their students, in their building—using their resources, with their curricular focus—real change begins to happen.

"We depend on the Educational Technology Center for staff development models, the latest information on educational uses of emerging technologies, unbiased advice on network design and forums for exchanging good ideas with other schools."

Jim Menzies
former Superintendent of the Tekoa School District

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Results at the community level...

Teams of teachers and students meet with graphics professionals in the regional ESD to learn the latest, user-friendly desktop publishing and mailing list programs so they can teach community groups how to communicate more effectively and efficiently. Once proficient, students will schedule an open house for senior citizens and others to teach the new skills to their elders, who will use district equipment during the evening hours when the labs are open to the community.

This state needs to take that next step in staff development programs by linking institutions of higher education with K-12 inservice providers and K-12 schools.

In a statewide survey of school districts in the fall of 1993 one of the critical needs identified was networking consultative services. Currently the ratio at which the education community is providing that service averages to about 9 hours per district or 1.5 hours per building, hardly adequate to meet the pressing need expressed by districts.

Expected Results

With increased access to networking consultation local school districts will be in a position to design cost-efficient networks which truly meet the educational needs of the schools and community. Relevant, in-depth staff development models provided in cooperation between higher education and K-12 will leverage resources from both sectors. These joint efforts will ultimately increase the knowledge and skill level of educators in using technology and telecommunications to increase student academic achievement and bring relevancy to the classroom.

Who/What

With legislative support, the Office of Superintendent of Public Instruction, in alliance with the educational service districts, will extend the services of the Educational Technology Support Centers to provide more in-depth networking consultative services. Those services will be provided through alliances with the ESDs as well as the Commission on Student Learning, school districts and institutions of higher education, to assist educators in designing and implementing new technology-related staff development models which support the new state essential academic learning requirements.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Networking Consultants	$ 175,000	$ 175,000	$ 350,000
Develop and implement new staff development models			
• Cadre of Trainers for ETSC	150,000	90,000	240,000
• Travel	18,000	9,000	27,000
• Equipment/Instructional Media for cadre	180,000	210,000	390,000
• Seed consortia of ESD, school district and/or higher education institutions to develop/implement new staff development models	300,000	150,000	450,000
Subtotal	$ 823,000	$ 634,000	$1,457,000

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$1,457,000	$1,400,000	$1,400,000

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Bridging the Resource Gaps

Recommendation #8

Enhancing the K-12 Statewide Electronic Network

Gap
The challenge before the state is how to wisely invest state dollars in infrastructure to meet the school districts' current administrative, student records and instructional needs for data traffic at affordable costs. Currently the educational provider of most data services to our schools, Washington School Information Processing Cooperative, is experiencing a sharp increase in schools seeking Internet connections which will require increases in capacity, reliability and availability. In the interim, many schools need dial-up capacity until they can carefully plan and implement routed networks.

Recommendation #8
It is recommended that the Legislature appropriate funds to OSPI for the enhancement, extension and continued operation of a state backbone (leveraging off all existing educational and governmental systems where possible) for the K-12 common schools across the state. And, furthermore, to connect schools to other learning resources such as public libraries, community and technical colleges and institutions of higher education.

Background
Washington State's WEdNet (the Washington Education Network) is a statewide administrative data and video network that is being enhanced to carry instructional and curricular traffic. In the process the education community has formed alliances with state government agencies to interconnect governmental and educational networks, providing economies of scale for all partners. Operated by the Washington State Information Processing Cooperative (WSIPC), WEdNet connects 277 of the 296 school districts administratively and provides 50 schools with routed connections to Internet (representing one-third of the school population).

"Because my schools are networked they are closely connected to community, homes and unlimited resources. These connections level the playing field for students living in rural and remote areas.

In a community such as Onalaska, our students must be prepared for jobs other than logging. Telecommications helps us expand their horizons."

Bob Kraig
Superintendent
Onalaska School District

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The site council for an elementary school met last night to develop a plan to use the $20.61 allocation (per student) for technology. With their realization of the need for reliable information comes a decision to network their library and connect to on-line electronic services.

Their local Educational Technology Center provides the networking consultation they need— recommendations on network design, information on state standards and protocols, and good references so they can learn from other schools who have already networked their libraries.

In addition, they get the good news that a state education backbone exists that they can connect into at affordable costs, taking advantage of the access policies already developed, the standards and protocols in place, and the on-line curriculum projects available through OSPI and the ESDs.

Expected Results

With the network and operational enhancements to WEdNet (Washington Education Network), school districts will have more network capacity and increased reliability of the network as well as increased dial-up capacity at the ESDs. This assures school districts that, as more clients get connected to the Internet and other curricular services over WEdNet, this state network will maintain service, reliability and support. The pricing structure of this system provides equity of cost and service regardless of geographic location of school districts in the state. OSPI will work with the Washington School Information Processing Cooperative and the Department of Information Services to leverage resources where possible.

Who/What

The Superintendent of Public Instruction will contract with the Washington School Information Processing Cooperative to upgrade the Washington Education Network to frame relay technology, diversify the WEdNet backbone long-distance routing to ensure reliability of service, and provide operational staffing to support these upgrades and the increasing use of the Internet hubs installed with state funding in 1993-94. In addition, OSPI will contract with the nine educational service districts to provide dial-up access to Internet for instructional purposes and networking expertise to assist districts. Every effort will be made to connect with public libraries, community and technical colleges and institutions of higher education.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Enhance WSIPC backbone to frame relay and upgrade ESD equipment for ATM and install new node at local co-location	$ 300,000	$ 400,000	$ 700,000
Diversify the WEdNet backbone	100,000	100,000	200,000
Provide dial-up capacity	186,300	64,800	251,100
Software/On-line Services	100,000	200,000	300,000
Network Operation/Planning	348,500	348,500	697,000
Subtotal	$1,034,800	$1,113,300	$2,148,100

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$2,148,100	$1,800,000	$1,200,000

Bridging the Resource Gaps

Recommendation #9

Electronic Destinations

Gap

With the rate of change in society today there is an increasing need for educators and students to have ready access to electronic information. Currently most source data which educators and students study in the academic subjects is not available in electronic form, or if it is available electronically it is not indexed to allow easy access by K-12 students or it is not affordable to schools. Examples include electronic encyclopedias, census data, geographic information, Washington state statistics on ecology, weather, climate, etc.

Recommendation #9

It is recommended that the Legislature appropriate funds to OSPI to support the conversion of data (text, video, audio, imagery, etc.) into electronic form to be made available to Washington K-12 learners at reduced rates. Priority will be given to in-state entities (e.g., universities, libraries, classrooms, museums, resource agencies). It is further recommended that the state secure rights to curricular resources deemed necessary by school districts (e.g., electronic access to an atlas, an encyclopedia, archival series of images on the Holocaust; Civil Rights video images, etc.).

Background

Many sources of information across the state do not offer their data in electronic form. This recommendation would seed agencies such as the Department of Community Trade and Economic Development, the University of Washington Art Department or the Department of Ecology to index their data electronically so that it might come to life through K-12 classroom access. This leverages the state funds in such entities to maximize the use of the information collected, analyzed and stored.

"As students research emergent global issues it is imperative that they have access to up-to-the-minute, in-depth on-line sources in their school libraries."

A. Elaine Twogood
Traveling Librarian
Tacoma Public Schools

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"After purchasing new wall maps and globes, the Soviet Union broke up and the materials were outdated before the school even paid the invoice," stated a library media specialist in a local school.

"Now that the state purchased rights to both an electronic encyclopedia and atlas, the information I am able to connect my students to is always up-to-date and accurate.

Students are especially interested in accessing information about their own state. When they can access aerial photos of virtually any community in the state, statistics on water quality in all Washington cities, trends in wildlife populations in the North Cascades, and see charts of the downturn in salmon spawning in any river they choose, they are excited to form their own hypothesis and then do the research necessary to support their analysis."

Expected Results

Washington learners will have access to primary source data at affordable costs, enriching the quality of the learning experience. This access is one means through which students will reach beyond the walls of the classroom to bring relevant, meaningful experiences into the learning process. This is a primary example of the third state learning goal "to think analytically, logically, and creatively, and to integrate experience and knowledge to form reasoned judgments and solve problems." In a creative teacher's classroom, this source data is the spark of relevancy to ignite students in attaining this goal.

Who/What

The Superintendent of Public Instruction will work with the Commission on Student Learning and an Education Technology Advisory subcommittee of K-12 library media specialists, curriculum specialists and other educators to identify source data which would support new approaches to learning in areas targeted by the Commission. A competitive process will be established through an advisory committee to OSPI, with clear priorities and clear expectations as to future access to the materials by K-12 students.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Licensing of media for state	$ 100,000	$ 150,000	$ 250,000
Grants to transfer data into electronic form accessible by schools	100,000	200,000	300,000
Subtotal	$ 200,000	$ 350,000	$ 550,000

	FY '95-96	FY '97-98	FY '99-2000
Biennial Budget Requests:	$ 550,000	$1,550,000	$ 550,000

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Bridging the Implementation Gaps

Recommendation #10

Integrating Technology into the Curriculum

Gap
Providing the access to the telecommunications is not enough. Students, teachers, paraprofessionals and administrators need a context within which to begin using the network for learning.

Recommendation #10
It is recommended that the Legislature appropriate funds to OSPI to develop, implement and assess technology-based curriculum projects which support Washington State's educational reform. Said projects would be in cooperation with school districts, educational service districts, the Commission on Student Learning, the Center for the Improvement of Student Learning and higher education institutions.

Background
Through an appropriation for technology in the 1993 Education Reform Act, the Office of Superintendent of Public Instruction is launching eight on-line curriculum and instruction pilot projects this fall (1994) involving over 300 classrooms statewide. For example the "It Ought To Be A Law" project connects 60 classrooms to state legislators and each other over the Internet. These students learn, firsthand about state government by interacting with legislators, proffering ideas for new laws, tracking bills through the 1995 legislative process and interacting with their legislators via interactive videoconferencing. This truly brings relevance to learning about state government and the legislative process.

This recommendation will support the continuation and expansion of those pilots which are deemed a success and will provide an opportunity to systematically involve novice teachers and students in the effective use of telecommunications as an instructional tool. Through each project a moderator coaches these

"What teaching moments we have had in this project! Fantastic discussions have occurred about how fragile history can be... One student reported, with fear in her eyes, that the elderly lady she was scheduled to interview had taken gravely ill. That student's connection to 'history' is very real!"

John Smith
Ferndale School District
Participant in the
Making History Real
On-line Pilot

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The "It Ought To be a Law" project connects 60 classrooms and interested state legislators in actively involving students in "legislation in the making."

This fall classrooms across the state are studying state government through participation. They will have the opportunitiy to work on-line with schools across the state to generate ideas on what "ought to be a law" while dialoging with their state legislators.

Once the state legislature convenes, students will track bills, poll their communities on issues, electronically stay current with bill changes, and communicate their opinions and polling with legislators via the Internet, and face-to-face via the statewide interactive video conferencing system.

Truly democracy at work.

teachers, paraprofessionals and students through an exciting curriculum which uses technology and telecommunications to bring relevance to the curriculum. Students are excited and interested to be part of "real" projects.

Expected Results

These pilots would result in the implementation of 20 new on-line curriculum projects which are directly tied to the state essential academic learning requirements. The projects would provide over 750 teachers and 1,900 students experience in using Internet to access resources, study with peers, contribute to a growing knowledge base and access experts across the evolving state telecommunications system for education. Ongoing staff development for participating teachers will be an integral part of these projects, guiding educators through the process of integrating the use of telecommunications into their curriculum. Ultimately this recommendation will provide a learning context for the telecommunications infrastructure.

Who/What

The Office of Superintendent of Public Instruction, in cooperation with school districts, the educational service districts, the Commission on Student Learning, the Center for the Improvement of Student Learning and higher education institutions, will establish projects and select classroom participants through a competitive process.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Contracts for moderators for 20 projects	$ 200,000	$ 200,000	$ 400,000
Training sessions for 20 projects	80,000	18,000	98,000
Staff for ETSC: 2.0 FTE	151,440	151,440	302,880
Staff for OSPI 1.5 FTE	97,845	97,845	195,690
Subtotal	$ 529,285	$ 467,285	$ 996,570

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$ 996,570	$1,500,000	$1,500,000

Bridging the Implementation Gaps

Recommendation #11

Integrating Technology into Teacher Preparation Programs

Gap

Generally, new teachers graduating from colleges of education in Washington State do not have the training and experience to effectively integrate technology and telecommunications into the learning process.

Recommendation #11

It is recommended that the Legislature appropriate funds to OSPI to pilot new models of training for prospective teachers, incorporating new technology-based instructional strategies and strong linkages between K-12 schools and state-approved teacher preparation programs. The pilots would be in partnership with the State Board of Education, the Higher Education Coordinating Board, the State Board for Community and Technical Colleges and institutions of higher education. It is further recommended that the State Board of Education and OSPI, with advisement from the Professional Education Advisory Committee (PEAC) incorporate technology in the current study on performance-based teacher certification.

Background

The current technology requirement for teacher certification is focused on skill with using the equipment rather that focusing on the preservice teacher's ability to use these tools to promote learning within an academic subject area. The new model would provide opportunities for collaborations between university professors and the K-12 educators, enabling the leveraging of resources and expertise as preservice teachers incorporate this new methodology into their repertoire.

Expected Results

Expected results will include prospective teachers graduating from colleges of education with an understanding of and the skills

"We need to give the college students in our teacher preparation programs the tools and insights into effectively using those tools to achieve the new state learning goals.

These young professionals can be the spark for bringing technology into the public schools."

Dr. Tony Jongejan
Western Washington University

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necessary to use technology and telecommunications to improve student learning. The infusion of language into teacher certification would result in more colleges of education adopting such models to ensure this result.

Who/What
The Office of Superintendent of Public Instruction, in cooperation with the State Board of Education, the Higher Education Coordinating Board and institutions of higher education will fund consortia of colleges of education and K-12 school districts to pilot new models of training for prospective teachers, incorporating new technology-based instructional strategies. The State Board of Education and OSPI, under advisement of PEAC will incorporate technology in the current study of performance-based teacher certification.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Grants to Teacher Education Programs w/K-12 alliances	$ 160,000	$ 340,000	$ 500,000
Summer Institute	10,000	10,000	20,000
OSPI grant manager	41,100	45,000	86,100
Certification Study	15,000	25,000	40,000
Subtotal	$ 226,100	$ 420,000	$ 646,100

	FY '95-96	FY '97-98	FY '99-2000
Biennial Budget Requests:	$ 646,100	$ 800,000	$1,200,000

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Bridging the Implementation Gaps

Recommendation #12

Information Policies

Gap
As technology and telecommunications are integrated into the K-12 educational system new information policies will be required to legally and ethically support the rights of all persons involved.

Recommendation #12
It is recommended that school boards review current policies to ensure that they appropriately address policy issues related to technology and telecommunications. And, that the Legislature provide funds to OSPI to coordinate the development and dissemination of model information policies related to technology and telecommunications for local school boards in cooperation with the Washington State School Directors' Association. Policy issues include: intellectual freedom; acceptable use policies for telecommunications services; privacy, security and confidentiality of data; etc.

Background
Telecommunications networks provide access to incredible resources, people, and services. Privacy, security, censorship and confidentiality are important issues within a print context, but with electronic access to information they are even more critical. Current policies on these issues may or may not be sufficient to address student, parent, administrator, and teacher/paraprofessional access to electronic networks as well as the collection, analysis and communication of various records.

"As technology and telecommunications are integrated into the education system, information policies are necessary to ensure the basic rights of all persons involved."

Education Technology Advisory Committee

8.0

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Sara hurries home to talk with her mom about an agreement she needs signed to get onto the Internet tomorrow at school. In reading through the information, her mom notes that some objectionable materials may be "happened upon" and asks her daughter if getting onto this "Internet" is really that important. Sara talks about the demonstration she saw today in school and how this would enable her to check out that idea about becoming an architect by "electronically chatting" with an architect on San Juan Island who is specializing in environmentally sound designs. She could actually do an internship with such a firm via Internet during her senior year and not have to leave their rural/ remote community.

Her mom signs, asking that they continue to talk about what Sara runs into on Internet.

Expected Results

When the appropriate policies are adopted, and associated procedures developed and implemented, the rights of all individuals and institutions will be protected; and students, educators, parents and community members will understand their rights and responsibilities in the use of telecommunications products, services and communication avenues.

Who/What

The Office of Superintendent of Public Instruction, in cooperation with the Washington State School Directors' Association, will provide pertinent information, model policies, analyses of issues and training sessions for school administrators, educators and school board members on the issue of information policies related to technology and telecommunications.

Budget Request

Budget Category	FY '95	FY '96	FY '95-'97
Grants for Training	$ 75,000	$ 75,000	$ 150,000
Subtotal	$ 75,000	$ 75,000	$ 150,000

	FY '95-'96	FY '97-'98	FY '99-2000
Biennial Budget Requests:	$ 150,000	$ 75,000	$ 75,000

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1995   1996   1997

Public Awareness Initiative for Education Technology

Technology Integration/Connections:
• School-to-work transition programs
• Essential academic learning requirements
• Performance-based assessment system
• Elementary and Secondary Education Act
• Goals 2000 initiatives
• School construction and modernization

School District Planning for Technology
• Development of district plans
• Approval by OSPI
• Continued refinement

Implementation of School District Technology Plans

Policy Development/Revision to Reflect Technology in Schools:
• Joint Select Committees
• Legislature/OSPI/School Boards
• Levy and Bond Language

Infrastructure Enhancement/Extension:
• WSIPC enhancement to frame relay
• Increased access for rural/remote schools
• Support for districts in network design
• Connection to public libraries, community colleges and institutions of higher education

Regional/State Support to School Districts:
• Staff development programs
• Network design, standards and protocols
• Technology planning
• On-line information, resources and projects
• Policy development regarding technology
• Curriculum integration
• Regulatory watch and advocacy

Protoypes, Partnerships and/or Grants:
• Community connections
• Affordable telecommunications rates
• State application for federal grants
• Coalition-building among stakeholders

Toward...

• Students' successful attainment of the state learning goals.

• Students' future economic viability.

• Students' universal, equitable access to information and technology for learning.

Appendix

94 WASHINGTON STATE TECHNOLOGY PLAN FOR K-12 COMMON SCHOOLS

Appendix A: Authorizing Legislation

ESHB 1209 Technology Sections, Chapter 336, Laws of 1993

Section 701. The legislature recognizes that up-to-date tools will help students learn. Workplace technology requirements will continue to change and students should be knowledgeable in the use of technologies.

Furthermore, the legislature finds that the Washington systemic initiative is a broad-based effort to promote widespread public literacy in mathematics, science, and technology. An important component of the systemic initiative is the universal electronic access to information by students. It is the intent of the legislature that components of sections 702 through 706 of this act will support the state-wide systemic reform effort in mathematics, science, and technology as envisioned by the Washington systemic initiative.

Section 702. Unless the context clearly requires otherwise, the definitions in this section apply throughout this chapter and section 705 of this act. (1) "Education technology" or "technology" means the effective use of electronic and optical tools, including telephones, and electronic and optical pathways in helping students to learn.
(2) "Network" means integrated linking of education technology systems in schools for transmission of voice, data, video, or imaging, or a combination of these.

Section 703. (1) The superintendent of public instruction, to the extent funds are appropriated, shall develop and implement a Washington state K-12 education technology plan. The technology plan, which shall be completed by December 15, 1993, and updated on at least a biennial basis, shall be developed to coordinate and expand the use of education technology in the common schools of the state. The plan shall be consistent with applicable provisions of chapter 43.105 RCW. The plan, at a minimum, shall address:
(a) The provision of technical assistance to schools and school districts for the planning, implementation, and training of staff in the use of technology in curricular and administrative functions;
(b) The continued development of a network to connect school districts, institutions of higher learning, and other sources of on-line information; and (c) Methods to equitably increase the use of education technology by students and school personnel throughout the state. (2) The superintendent of public instruction shall appoint an education technology advisory committee to assist in the development and implementation of the technology plan in subsection (1) of this section. The committee shall include, but is not limited to, persons representing: The state board of education, the commission on student learning, the department of information services, educational service districts, school directors, school administrators, school principals, teachers, classified staff, higher education faculty, parents, students, business, labor, scientists and mathematicians, the higher education coordinating board, the work force training and education coordinating board and the state library.

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APPENDIX

Section (704) In conjunction with the plan required in section 703 of this act, the superintendent of public instruction shall prepare recommendations to the legislature regarding the development of a grant program for school districts for the purchase and installation of computers, computer software, telephones, and other types of education technology. The recommendations shall address methods to ensure equitable access to technology by students throughout the state, and methods to ensure that school districts have prepared technology implementation plans before applying for grant funds. The recommendations, with proposed legislation, shall be submitted to the appropriate committees of the legislature by December 15, 1993.

Section (705). A new section is added to chapter 28A.310 RCW to read as follows: Educational service districts shall establish, subject to available funding, regional educational technology support centers for the purpose of providing ongoing educator training, school district cost-benefit analysis, long-range planning, network planning, distance learning access support, and other technical and programmatic support. Each educational service district shall establish a representative advisory council to advise the educational service district in the expenditure of funds provided to the technology support centers.

Section (706). The superintendent of public instruction to the extent funds are appropriated, shall distribute funds to educational service districts on a grant basis for the regional educational technology support centers established in section 705 of this act.

Section (707). The superintendent of public instruction, to the extent funds are appropriated, shall distribute funds to the Washington school information processing cooperative and to school districts on a grant basis, from moneys appropriated for the purposes of this section, for equipment, networking, and software to expand the current K-12 education state-wide network.

Section (708). (1) The superintendent of public instruction may receive such gifts, grants and endowments from public or private sources as may be made from time to time, in trust or otherwise, for the use and benefit of the purposes of educational technology and expend the same or any income therefrom according to the terms of the gifts, grants, or endowments. (2) The education technology account is hereby established in the custody of the state treasurer. The superintendent of public instruction shall deposit in the account all moneys received from gifts, grants, or endowments for education technology. Disbursements from the account shall be on authorization of the superintendent of public instruction or the superintendent's designee. The account is subject to the allotment procedure provided under chapter 43.88 RCW, but no appropriation is required for disbursements.

Section 709. The superintendent of public instruction shall adopt rules as necessary under chapter 34.05 RCW governing the operation and scope of this chapter.

Section 710. Sections 701 through 704 and 706 through 709 of this act shall constitute a new chapter in Title 28A RCW.

Appendix B: Definitions

Connectivity

Connectivity is the state of being linked electronicaly and/or optically. Included in the requirements for connectivity are the following: purchase, installation, operation and upgrading of the networks (e.g., network and electrical wiring, cabling, servers, routers, modems, related installations), purchase, installation, operation and upgrading of the electronic and/or optical equipment connected to the network (e.g., computers, CD-ROM players, videodisc players, peripherals), and training necessary for the effective operation and integration of this connectivity into the learning process.

Distance Learning

Learning which takes place in situations where the learners and the instructor(s) (and/or instruction) are at a geograhical distance and are connected instructionally via telecommunications.

Education Technology

Education technology is the effective use of electronic and optical tools, including telephones, and electronic and optical pathways in helping students to learn. (Source: Chapter 336, Laws of 1993.)

Internet

Internet is a world-wide "network of networks" which literally connects millions of users across the globe to services such as electronic mail, research libraries, federal archives such as those from NASA (National Aeronautics and Space Administration), etc.

Learning Environment

A learning environment is a physical place where students are engaged in an educational process. The location can include school buildings, libraries, community centers, places of business, museums, etc.

Network

A network is an integrated linking of education technology systems in schools for transmission of voice, data, video or imaging, or a combination thereof. (Source: Chapter 336, Laws of 1993.)

Technology

1) Technology includes two components: A product—the tool that embodies the technology, and a process—the information base of the technology. (Source: Why Use Technology? Educational Leadership Vol 51 #7 April 1994. Kyle L. Peck and Denise Dorricott.)

2) Technology is the combination of human imagination, inventiveness and the tools and processes to transform ideas into reality. (Source: Wenk, Trade-offs 1970)

Technology Education

An activity-oriented program that develops proficiencies in technological design, problem-solving and decision-making process, and demonstrates the impact of technology on individuals, society and the environment.

Technology Related Investments

Technology related investments are electronic and/or optical equipment that help students learn. Such equipment includes computers, CD-ROM players, videodisc players, peripherals, electronic microscopes, CAD hardware, and associated networks (e.g., network and electrical wiring, cabling, servers, routers, modems, software, networks and other peripherals. Also included are expenditures incidental to the integration of the technology related investments into the learning process. (Source: WAC 392-140-545.)

Telecommunications

Telecommunications is the act of communicating at a distance through the use of technology and an electronic/optical network.

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Appendix C: Time Lines

The Education Technology Advisory Committee worked through the fall of 1993 to establish a framework and Phase I recommendations for the State Technology Plan for K-12.
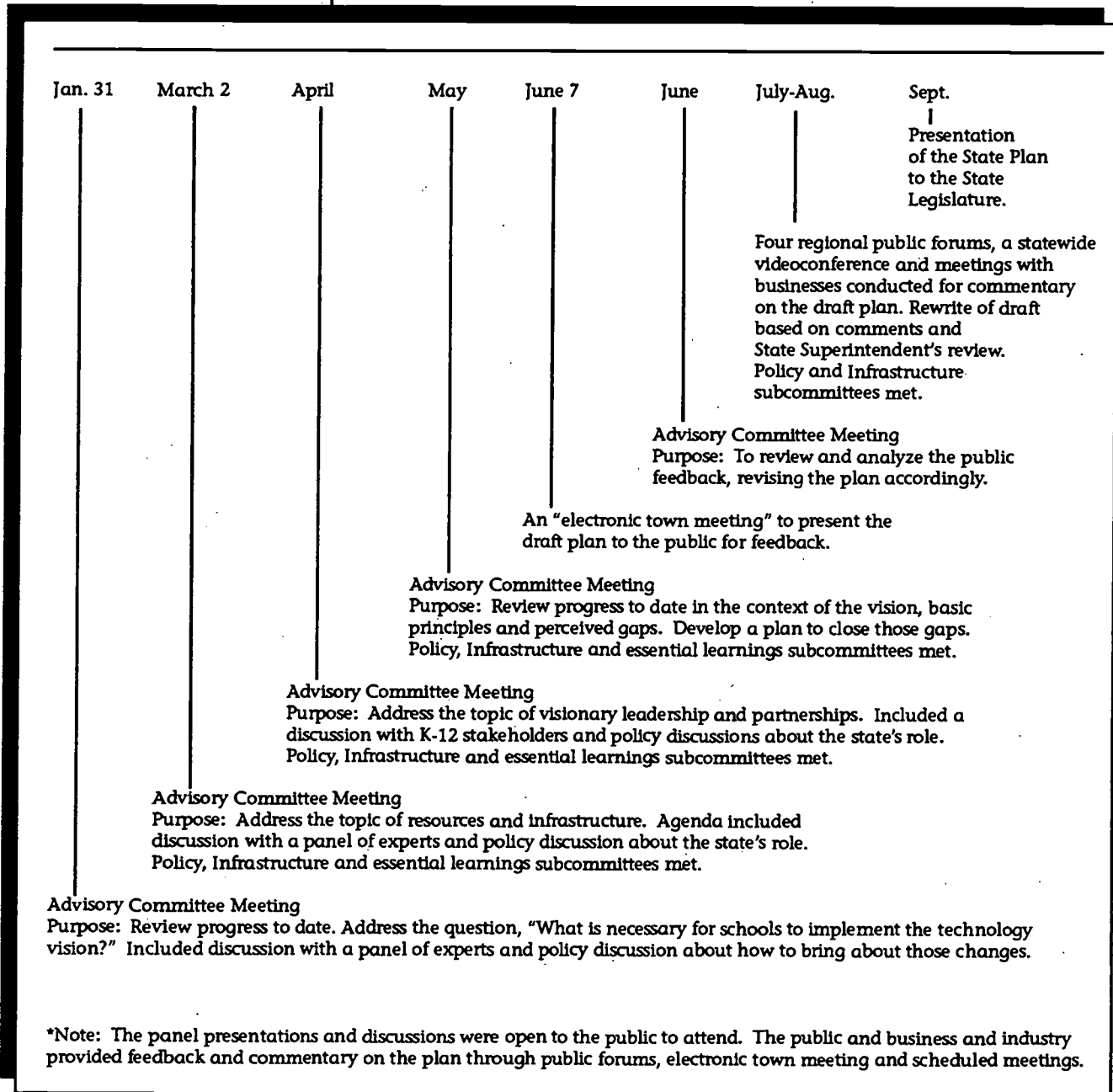
1993 Planning Time Line

Oct. 11	Oct. 29	Nov.10	Nov. 22	Dec. 1,3	Dec. 9	Mid. Dec.	Jan. 94

Presentation of interim report to State Legislature.

Draft of Nov. 10 work sent out for comments. Rewrite of draft based on comments and State Superintendent's review.

Advisory Committee Meeting
Purpose: To clearly identify the gaps/ educational needs, ways to close those gaps, and identify Phase I recommendations vs. those issues for further study.

Dec. 1 - Business-Education Forum in Seattle
Dec. 3 - Business-Education Forum in Spokane
Purpose: Solicit input from business and industry

Paper review of first draft of work to date.

Advisory Committee Meeting
Purpose: To develop a framework for the plan, identify the current status and the expected outcomes in preparation for a gap analysis.

Advisory Committee Meeting
Purpose: Overview of current state initiatives under ESHB 1209; finalize the vision, basic principles and identify the target population for the plan.

State Superintendent convened the Advisory Committee
Purpose: Overview of Task, initial orientation to K-12 education technology and development of a vision and basic principles.

*Note: Throughout October, November and December a writing team met to draft the policy discussions of the Advisory Committee into a comprehensive form. This provided the Advisory Committee with documents for review.

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ERIC

94 WASHINGTON STATE TECHNOLOGY PLAN FOR K-12 COMMON SCHOOLS   APPENDIX

1994 Planning Time Line

The Education Technology Advisory Committee continued to meet between January and August. The committee clearly defined the vision for education technology in schools. They conducted an indepth look at the current status of our schools, the current state initiatives in technology and planned the optimum state design for K-12 schools to follow in order that each student might reach the vision.

Jan. 31	March 2	April	May	June 7	June	July-Aug.	Sept.

Sept.
Presentation of the State Plan to the State Legislature.

July-Aug.
Four regional public forums, a statewide videoconference and meetings with businesses conducted for commentary on the draft plan. Rewrite of draft based on comments and State Superintendent's review. Policy and Infrastructure subcommittees met.

June
Advisory Committee Meeting
Purpose: To review and analyze the public feedback, revising the plan accordingly.

June 7
An "electronic town meeting" to present the draft plan to the public for feedback.

May
Advisory Committee Meeting
Purpose: Review progress to date in the context of the vision, basic principles and perceived gaps. Develop a plan to close those gaps. Policy, Infrastructure and essential learnings subcommittees met.

April
Advisory Committee Meeting
Purpose: Address the topic of visionary leadership and partnerships. Included a discussion with K-12 stakeholders and policy discussions about the state's role. Policy, Infrastructure and essential learnings subcommittees met.

March 2
Advisory Committee Meeting
Purpose: Address the topic of resources and infrastructure. Agenda included discussion with a panel of experts and policy discussion about the state's role. Policy, Infrastructure and essential learnings subcommittees met.

Jan. 31
Advisory Committee Meeting
Purpose: Review progress to date. Address the question, "What is necessary for schools to implement the technology vision?" Included discussion with a panel of experts and policy discussion about how to bring about those changes.

*Note: The panel presentations and discussions were open to the public to attend. The public and business and industry provided feedback and commentary on the plan through public forums, electronic town meeting and scheduled meetings.

Appendix D: Technology in Schools: What Does the Research Say?

This legislative report is based on the premise that technology will play a critical role in students' successfully attaining the four state learning goals. This review of the literature is not meant to definitively summarize all research on technology in education but rather to answer the more specific question:

Is there a research base to indicate that technology can play a critical role in students' successfully attaining the four state learning goals in Washington State?

While there continues to be an emphasis by the state on the academic areas, the threads of critical thinking and problem-solving, communication, life-long learning, integration of traditional academic and vocational experiences, school-to-work transition and performance-based assessment are woven tightly into the fabric of the reform. And the Reform Act clearly includes technology and telecommunications as factors in education reform in Washington State.

Within this education reform context, the integration of technology into the learning process is neither simply to speed up the process of learning nor to simply teach new technology skills. Rather the intent of the integration of technology under the Reform Act is to add a catalyst and technological factor, which combined with other reform efforts (e.g., new instructional strategies, new uses of time and staffing), will help schools become learning environments which empower students to successfully attain the new state learning goals.

Comparative Design: Traditional research in educational technology has focused on computers as an instructional delivery system. Meta-analyses of research studies in areas such as computer-assisted instruction, videodiscs, distance learning, telecommunications, academic areas and special populations are well-documented. (A meta-analysis is a method of assessing the effects of a treatment across many different studies using a common measurement scale, called effect size.)

This research tends to stress what the Office of Educational Research (OERI) from the U.S. Department of Education refers to as "horse race" studies, that is, studies which compare delivery of content via a media such as computers with delivery via another media such as radio or textbook or lecture. The 1993 OERI report, <u>Using Technology to Support Education Reform,</u> states that "most of this literature finds newer technologies to be either equivalent or superior to conventional instruction with regard to student learning," citing Bialo & Sivin (1990).

The intent of the integration of technology in schools is to add a catalyst and tools which, combined with other reform efforts, will help schools become learning environments which empower students to successfully attain the new state learning goals.

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However, it further reports that when Clark (1985) re-examined the studies in the meta-analysis on computer-aided instruction he found that many studies did not "control" for instructional methodology. When he re-analyzed to hold that factor constant he found virtually no effect related to instructional delivery media. The OERI document goes on to discuss the limitations of the "horse race" studies suggesting that, as is the case with this technology plan, it is rare that technology is introduced to simply change the instructional delivery mode without combining it with changes in instructional methodology, content changes, different groupings of students, varying use of time, etc.

A comparison of ten "horse race" studies involving videodiscs as an instructional delivery media in a variety of academic areas, suggests significant effectiveness of videodiscs when the content has motion-visual or aural components as discussed by Sivan-Kachala (1994). A second meta-analysis of 47 studies regarding videodisc usage with conventional instruction in military, higher education and industry indicate a strong positive effect on learning.

Overall conclusions from the Software Publishers Association's Report on the Effectiveness of Technology in Schools 1990-1994, indicate that "recent research consistently demonstrates the value of technology in enhancing student achievement." The authors, Sivin-Kachala and Bialo analyzed comparison studies relating student achievement in the curriculum areas of mathematics, reading, writing, science, English as a second language; among special populations such as early childhood, learning disabled, low-achieving students; and with technologies such as computers, videodisc and CD-ROM media, telecommunications and video.

Three of the studies are summarized below:

- Foster, Erickson, Foster and Torgeson developed a program called Daisy Quest (tutorial and practice) to increase phonological awareness (e.g., "one's sensitivity to, or explicit awareness of" the structure of sounds in one's language). Daisy Quest uses sophisticated digitized speech in assisting children to recognize identical sounds or sound combinations across words. In two separate studies and five different measures of phonological awareness, the computer-based approach was found to be significantly more effective than regular instruction.

- Niedelman used videodisc technology in an earth science class, comparing student achievement to a control group using a textbook-based instructional approach. The videodisc stressed causal relationships instead of topics and used charts as graphics organizers to synthesize and organize interrelated information. Students using the videodisc achieved at significantly higher levels than students receiving textbook plus hands-on instruction on a test of content knowledge and a test of science problem-solving skills.

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•Smith conducted an evaluation of the National Geographic Kids Network telecommunications-based science activities with fourth and fifth graders. Results included: 1) significant increases in the students' use of graphs for organizing observations... while the control group did not; 2) significant improvement in data interpretation skills; and 3) significant improvement in place knowledge, map location, reasoning skills.

Contextualized Studies: The OERI discusses "contextualized" research which goes beyond the one-dimensional aspect of "horse race" studies in a "new approach to measuring the effects of technology-based innovations on student learning." The OERI report cites a 1991 research study by Salomon in which he likens the isolation of the instructional delivery media to asking "how much did the flute, in a 120-piece orchestra, contribute to the quality of the music." The use of technology in a contextualized learning environment contributes to the whole effect. The important question then is how each factor interacts with others to bring about the learning effect.

Riel's 1989 study of fourth graders using telecommunications is cited by OERI as an example of contextualized research. In this study, four classes in San Diego participated in an on-line telecommunications project with students from Hawaii, Mexico and Alaska in which they contributed news to the "newswire" and produced a collaborative newspaper.

As a result of this project, the reading and writing skills of the four San Diego classes jumped over one grade level. OERI further reports, "Those students who served as volunteer editors showed striking gains in language mechanics." The conclusion of the study was "the experience of editing others' writing produces more improvement than practice correcting one's own mistakes and that students are reluctant to edit the work of their classmates but much freer to criticize and correct the work of a distant peer." Again, in this contextualized study, computers and telecommunications linkages provided the ability for students to exchange and critique each others' work in a timely format.

Based on a significant number of contextualized studies, OERI concludes that "when used as part of an instructional approach involving students in complex, authentic tasks, technology can support the kind of transformation of student learning that is at the heart of education reform."

Overall research and survey findings conclude:
1) Educational technology has demonstrated a significant positive effect on achievement within all major subject areas, in K-16 and both regular education and special needs students.
2) Educational technology has been found to have positive effects on student attitudes toward learning and on student self-concept.
3) The level of effectiveness of educational technology is influenced by the specific student population, the software design, the teacher's role, how the students are grouped and the level of student access to the technology.

"When used as part of an instructional approach involving students in complex, authentic tasks, technology can support the kind of transformation of student learning that is at the heart of education reform."

Office of Educational Research and Improvement (1993) U.S. Department of Education

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APPENDIX

4) Introducing technology into the learning environment has been shown to make learning more student-centered, to encourage cooperative learning, and to stimulate increased teacher/student interaction.

5) Courses for which computer-based networks were used increased student-student and student-teacher interaction, specifically with lower-performing students, and did not decrease traditional forms of communication.

Is technology in K-12 schools necessary to assure students' future economic viability (as well as that of Washington State)?

The Washington Roundtable's document, What's Expected of Today's High School Graduates? A Business Perspective on Skills for Living and Working, clearly articulates the role of technology in virtually every job classification referenced and links each of the state learning goals to work skills. The Roundtable further states that "our education system, quality of life and economy in this state are all connected."

In a much-quoted national report by the 1991 Secretary's Commission on Achieving Necessary Skills (SCANS), U.S. Department of Labor, technology is listed as one of the five workplace competencies needed for solid job performance. The report states that our present education system does not prepare students to enter a workforce that has been drastically altered by the globalization of commerce and industry, and the explosive growth of technology on the job. And the commission points out, "When all is said and done, the high performance future requires a radically different organization of work and a radically different kind of workforce. The ability of managers and workers to get the best out of new technologies, new processes and new markets remains our best competitive advantage."

The 1993 Interface Report, produced by the Washington Software Association, endorses many of the concepts of the SCANS report stating that "Today, the U.S. enjoys the largest market share, on a world-wide basis, for software... Providing our industry with work-ready students is a matter of economic necessity integral to our well-being as a region, as a state, and as a nation." Of the twenty-two skills and competencies identified in the report for work-ready software employees, the top two were interpreting and communicating information and using computers to process information.

These reports call for priority action by educators and industry leaders to begin NOW to integrate work skills, including those related to technology, into the K-12 curriculum.

> "Our present education system does not prepare students to enter a workforce that has been drastically altered by the globalization of commerce and industry, and the explosive growth of technology on the job."
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> *The SCANS Report 1991 Secretary's Commission on Achieving Necessary Skills, U.S. Department of Labor*

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