Report and Recommendations

Findings of the Technology in Education Task Force

September 1998

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Technology in Education Task Force Report & Recommendations

Welcome:

Your first response to picking up this report will probably be that it is lengthy. We are unapologetic, since we have an important and complex story to tell. Our hope is that every reader will eventually make it through the entire document. Knowing that many of you are extremely busy, I would like to point out key sections not to be missed during even a "quick read."

The Executive Summary covers the key issues and provides a synopsis of the recommendations.

The Case for Technology in the Schools makes cogent arguments for investing in school technology.

The Recommendations should be read in the entirety.

Appendix A contains the report of the data from our survey of 296 school districts and contains extremely useful information on technology deployment at a statewide level.

Teachers and other educators should be sure to read Appendix C which is a compilation of best practices in educational technology from throughout the state.

I would like to thank all the members of the Technology in Education Task Force for their stellar work over the past year. Our hope is that this report will be viewed as a key guidepost on an important journey. The work of this committee is aimed at substantially advancing both policy makers' and the public's understanding of the importance of technology in K-12 education. I deeply appreciate their dedication to this effort.

Marty Smith
Chair

Technology in Education Task Force

Executive Summary

Overview

The Technology Alliance, in collaboration with Washington Governor Gary Locke and Washington Superintendent of Public Instruction Terry Bergeson, convened in October of 1997 the Technology in Education Task Force, a group of two dozen educators, legislators, business leaders, and others with expertise and interest in the educational technology field. The Task Force worked for several months to shape a set of proposed action steps to accelerate the best uses of technology to improve student achievement in Washington's K-12 public schools. As part of that effort, the Task Force surveyed the 296 school districts in the state about their educational technology programs; the results of that survey are integral to this report. The Task Force also took note of the following facts:

Washington's economy is increasingly reliant on knowledge workers. For Washington's students to have a chance of participating successfully in our growing knowledge-based economy, our schools need to do an excellent job of preparing students for a technology-rich world and workplace. **What does this imply for our state's education system?** Simply put, **access to technology tools and the skills and knowledge they develop is an essential component of a competitive school system.** If our children are going to be competitive in a 21st century workplace they must have these skills**; and, in fact, excellence in this arena can give our children tremendous advantages.** Ignoring technology or poor use of these resources leaves our children, and our state, behind. The wise use of technology is only one ingredient in a comprehensive program of education reform, but it is a key ingredient, and strengthens many of the other efforts to improve our schools.

The central reason for learning technology skills is to support and enhance students' academic achievement. Children learn to keyboard in order to write more clearly, more quickly, and with more confidence. They learn to use the Internet to do research and access information from all over the world; they use math software and learn spreadsheet programs to solve real world problems. Technology, when guided by good teachers, aids and enhances student learning. Can children learn to be good writers without computers? Yes, of course. Will they become better writers sooner with well-designed computer-based curriculum? The answer is also yes.

The whole world is getting wired. Offices, homes, libraries, hospitals, universities, hotels --every institution in our society is transforming itself to respond to the information age. It seems decidedly wrongheaded to leave our most essential places of learning, our schools, out of this transformation. Of all places, our schools should be the ones at the *top* of the list for participating in the information age, not at the bottom. School, after all, is the place where information, and one hopes, knowledge, is transmitted.

The Four Pillars

It is widely agreed that four elements are required for the successful implementation of educational technology, each of which the President has described as a "pillar". All of the

elements must be present for an educational technology program to be successful. These Four Pillars are:

- ✓ personal computers and other related **hardware**
- ✓ wiring classrooms and other learning spaces to connect to the Internet, called **connectivity**
- ✓ **content** and curriculum development, and
- ✓ teacher training or **professional development.**

A national group of technology executives called the **CEO Forum on Education and Technology (CEO Forum)** has further delineated what are the necessary components in each of the four pillars and has created a "STaR Chart" for assessing School Technology and Readiness. The CEO Forum is conducting an annual benchmarking of America's schools over the next four years in hopes of measuring their movement from "Low Tech" to an ideal level they call "Target Tech." The goal is to successfully integrate all four pillars into a seamless program that uses technology tools to improve students' academic achievement.

As was learned from the Task Force's survey, Washington state has made some progress in all four of the pillars. We have, however, significant work ahead of us to have our K-12 public schools throughout the state at the Target Tech level.

✓ **HARDWARE** As of 1998, Washington State has a fairly good ratio of students to personal computers, with four students per personal computer at the high school and junior high level, and five students per personal computer at the grade school level. However, over half of these personal computers are obsolete and outdated, which severely limits what teachers can do with them instructionally. Currently, there is only one "networkable" computer for every 13 students in our state. Maintaining computer hardware and systems is a seriously under-funded component of most school programs. A typical technical support professional in a business setting will support about 40 personal computers. Even in the most well funded school districts, a typical tech staff person is supporting over 350 personal computers. Only 14% of our school districts can meet a "down-time" of two days or less for a classroom computer, and 30% of our school districts have no "official" maintenance staff at all.

✓ **CONNECTIVITY** Washington state has invested over $60 million in the "K-20 Network," the state's own high-bandwidth educational network, linking schools that educate students from kindergarten through graduate school. This system, which is currently being built, does not include plans or funding for each school's internal network or wiring. At the local level, school districts and buildings, because of differing resources, priorities, experiences and outlooks, have placed varying degrees of emphasis on connecting their teachers and students to online resources. However, the promise of the K-20 network has served as an incentive to local school districts, and 64% of Washington's K-12 public school instructional spaces now have a direct link to the Internet. Additionally, 85% of our schools have a least one local area network (LAN) and 76% of our schools have at least one dedicated data line. However, there are still 5% of our school districts (representing 6,000 students) that have no Internet access at all.

✓ **CONTENT** Three key definitions help outline this pillar. *Content* is defined as the substantive material used to teach subject matter. Examples of content are: a story read out loud; a math problem set; a history textbook; a software program with math puzzles; a web site on the rainforest. *Curriculum* is a collection of content, together with lesson plans, activities and other processes, organized into a scope and sequence that constitute the plan for achieving educational objectives. *EALRs* are the Essential Academic Learning Requirements. This is the term Washington State uses to describe what children in our state should be able to achieve, know and apply at certain defined milestones as a result of their schooling. They are objectives that the content and curricula should be organized to achieve.

In Washington state, the use of technology to develop and deliver content and curriculum varies enormously from school to school, and from classroom to classroom within a school. The technology-in-schools movement has been led by a few teacher-pioneers, often called "early adopters" who have found a variety of ways to get kids excited about learning through the use of technology. The challenge for our state is to develop curriculum, both in traditional and electronic forms, that is tied to the EALRs, as this is how our children, their teachers, school administrators, and the public will measure success over the decades to come.

✓ **PROFESSIONAL DEVELOPMENT** This topic falls into two distinct areas: ***Pre-Service*** or the training teachers receive as they prepare for the profession in college; and ***In-Service*** or the training teachers receive after they have graduated and begun their professional careers.

Pre-Service: A majority of our teacher preparation programs are falling far short of what needs to be done to prepare teachers for 21st century classrooms. Few teacher preparation programs have identified or allocated the funding required to reshape their curriculum to integrate technology in meaningful ways. Many colleges and universities are making the same mistake that was made by K-12 schools in the early year of the technology-in-schools movement: they treat "technology" as a special addition to the teacher education curriculum--requiring specially prepared faculty and specially equipped classrooms--but not as a topic that needs to be incorporated across the entire teacher education program. The result is ill-prepared new teachers who are much more costly to train than college students, wasting professional development dollars our state can ill afford to squander.

In-Service: In the past several years, many of Washington's current teachers have developed basic computer skills, but they still ask, "How do I use a computer in ways that enhance students' academic achievement and keep them interested in learning?" The vast majority of teachers indicate that they need more training if they are to use technology effectively in the classroom. Studies have concluded that for teachers not trained to use technology during pre-service training, it takes four to five years of in-service training and practice for a teacher to use technology in ways that would match the "Target Tech" standards defined in the STaR Chart.

The model for curriculum integration training often focuses on identifying early adopters who offer training to other teachers. If these technology missionaries are unable to persuade their colleagues to use technology, there is no real incentive for teachers to take the time to learn how to use technology effectively. Principals frequently have had no technology training and often do not use technology to manage

their personal productivity or their school's systems. **A principal frequently puts the staff's needs for training before his or her own; the unfortunate result is many principals that have no experience with how technology can strengthen learning and teaching in general, let alone school administration.**

Integration and Use

The CEO Forum estimates that only 4% of the nation's classrooms are currently at the Target Tech level. Washington state has some great individual examples, but the Task Force's educated estimate is that fewer than 5% of our state's public K-12 classrooms currently meet the Target Tech standard.

Funding

Spending on technology during the 1997-98 school year averaged $133 per student, for an estimated total of $132 million for all Washington public schools. **Funding educational technology is highly problematic for many school districts.** Most school districts do not have nearly enough funds available for their technology needs in their basic operating budgets. A common source of technology funding is through a capital bond or levy. (Thirty percent of district technology monies come from this source.) School districts that can pass a capital bond or levy for technology often end up relying on those sources for most of their technology funding.

Important and disturbing disparities result from the wide range in property values in our state. Districts with higher per pupil property assessments are likely to spend more money per student on technology than those with lower per-pupil property assessments. Federal funding has helped some schools supplement their technology budgets, but it is not a significant source to most districts.

A **new source of money to school districts** comes from a fund designated by the legislature with the cooperation of the governor, called the **Education Savings Account** or Fund 291. This fund provided $19.5 million in school technology grants in 1997 and the another $19.5 million in 1998.

Washington state's constitution provides that it is the paramount duty of the state to make ample provision for the "basic education" of all children in the state. The most comprehensive---although the most politically controversial---solution, would be to **redefine basic education to include technology.** A potential source is NERC (Non Employee Related Costs) funds, which are allocated by the legislature as part of the basic education package. If technology is considered to be part of basic education, then it can and should be included in NERC.

Ninety-five percent of school districts have some sort of technology plan, but only 14% have 90% or more of the funding identified to implement their plans. Technology

plans vary widely in their comprehensiveness. While 64% of the plans include a five-year depreciation and replacement program for equipment, that means that over one third of school districts have not built into their budgets a planned means to replace outdated equipment.

Conclusions

Technology, when integrated into school settings thoughtfully and systemically, has the potential to significantly impact student academic achievement. This process is not easy, nor inexpensive. However, when it is done well, the rewards for children—and their parents and teachers—is significant. Current spending on technology is vastly inadequate, and the spending that is occurring is often determined by the vagaries of funding mechanisms rather than what a school district would like to do if it had more control and flexibility over its finances.

Unfortunately, given the substantial expenditures required to establish a competent technology program in a typical school district, the intractable obstacles of state funding limits, *and* the widespread inability to pass levies, **there does not appear to be any ready or simple solution** which will achieve the realization of the benefits of technology in our public education system on a statewide basis. There will need to be identified some new means of funding not currently in place for our state's children to achieve the educational benefits technology can bring.

Business has poured billions into learning how to manage itself in new ways: by using technology to organize work projects in innovative ways it has become more efficient, as well as more responsive to customers, suppliers and employees. Technology made this change possible and forced the change to happen even in organizations that resisted mightily. Schools are undergoing a similar metamorphosis, from centrally managed bureaucracies to more de-centralized learning communities. Technology will first make this change possible, and then the resulting changes will force new changes to occur. **We can fight this change; do it badly, inefficiently and inequitably; or we can do it right.** It is going to happen sooner or later anyway, and we are early enough in the process to affect change wisely and well.

Next Steps

The Technology Alliance has agreed to work in collaboration with the office of the Superintendent of Public Instruction to administer the technology survey annually over the next four years in order to benchmark the progress our state is making.

The following are our recommendations:

Section
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Summary of Recommendations

1. Computers Alone Are Not Enough

Acquisition of computer hardware must be integrated with all the other component pillars in order to insure that technology will work successfully in school settings. Included as part of technology acquisitions by schools must be a plan for hardware and system maintenance; connections to the Internet; training teachers and other professionals both on the general use of the technology and its use in the instructional process; appropriate electronic curriculum; and the ongoing funding of all the foregoing. Schools should spend money on new computers only after they have an integrated multi-year plan that includes all of the elements listed above. Current funding mechanisms, which do not support an integrated approach, need to be changed.

2. Investing in People is Essential

The lack of professional development for teachers is the biggest unmet need in the current state of technology in education in Washington. Lack of training for school administrative leadership and lack of technical support in schools run a close second.

A) The Office of the Superintendent of Public Instruction (OSPI), with the support of the Legislature, and the cooperation of the Governor's office, the Educational Service Districts (ESDs), and the professional associations, should develop and disseminate lesson plans and other instructional guides in the best uses of technology in the classroom. Staff training in technology use needs to get a substantially larger portion of in-service training budgets.

B) A comprehensive professional development program should be established for principals and superintendents in educational technology. This program should include guidance on the most effective uses of technology in classrooms, the funding of technology in schools, and the support of teachers as users of technology in instruction.

C) Our state's teaching colleges should review and revise their teacher training curriculum so that it is more responsive to both ongoing education reform and to the use of technology in the educational process; this should occur without delay.

D) The state staffing formulas for public K-12 schools should be increased to provide an adequate budget for schools to hire lead technology staff and technology support staff.

3. Funding Priorities for Technology Must Be Addressed and Done So on a Statewide Basis

An integrated, statewide approach to funding technology in our public K-12 schools is urgently needed to improve the overall effectiveness and fairness of current and future technology programs. Current funding for technology in Washington's public schools is inadequate and inequitable and comes from a confusing hodgepodge of sources. Key statewide infrastructure investments have already been made by the state. These infrastructure investments now need to be followed up with a wise use of increased funding to assist all of our K-12 public schools in the integration of technology into the educational process.

A) The Education Savings Account or Fund 291 is an important statewide resource for technology in the classroom and needs the ongoing support of the Legislature.

B) The definition of "basic education" needs to be updated to include technology. NERC (Non Employee Related Costs) funding needs to be increased to address the impact of technology expenditures.

C) Private philanthropy from foundations & businesses should support technology projects & programs in our public schools that take an integrated approach, addressing all four pillars.

4. The Challenge Requires Leadership at the State Level

Some part of official Washington state is going to have to make the effort to see that the tools and training we need are provided. Fundamentally, this is a local problem because of the way our schools are financed in this state. Technology in the schools is not going forward where levies fail. Notwithstanding this essentially local condition we believe that the necessary ingredient is state leadership.

The breadth and complexity of the undertaking suggest that, despite our promising head start, we could easily end up with an inadequate, spotty result.

The Task Force believes that sound leadership at the state level could develop and activate an effective mass of support at the private level from community organizations and from the business community. If we can build, simultaneously, a new professional stadium for both our baseball and football teams, there should be a way to obtain the best of modern educational experience for our public school children.

Section

3

Report and Recommendations

Introduction

The Washington State Legislature has designated 1998 the "Year of Learning Through Technology." The Technology Alliance's Technology in Education Task Force has spent several months in a collaborative effort with the Governor's Office, the Office of the Superintendent of Public Instruction, state legislators, educators, business leaders and other community partners in an effort to advance the promise of that declaration. This report is the distillation of the efforts of the Task Force to identify the current state of technology use in Washington's schools, and to recommend the practical steps necessary to make our schools the best they can be.

In the wake of widespread efforts to bring about significant improvements in the effectiveness of our K-12 public schools, there is another major, and not unrelated, movement underway. That is a movement to equip our public schools to give our children the experience and skills they need to flourish in today's knowledge-based world—a world whose tools have metamorphosed from those of prior generations. Business, government and education leaders increasingly have recognized the educational and work place benefits that investments in technology for our schools can bring. These benefits accrue when students are prepared to use the new tools of today's business and when teachers and students gain access to the fruits of a world in which all information is available at one's fingertips and communication with others anywhere on the globe is immediate and inexpensive.

The Technology Alliance is a statewide network of technology-based businesses, their trade associations, and research institutions dedicated to improving the climate for technology-based business in Washington state. The vision of this organization is an abundance of technology businesses in a flourishing state economy. The Alliance sees a variety of conditions that need to be met in the public sector to make this vision, over time, a reality. Foremost among these conditions is a first class system of public education throughout our state. To those who make decisions about where to work and where to locate a business nothing is more important than a school system that promises a quality education for their children and a competent work force for their businesses. Excellence at all levels of education is necessary for our children to excel--- in kindergarten through high school, in technical and undergraduate education, in professional degree programs, and in research institutions. For the purposes of this report, we will focus solely on K-12 public education.

The establishment and maintenance of a first class education system is a matter of doing a *better* job than other regions which are striving to attract and retain technology and other businesses, not just doing well on some linear scale. Success in filling these conditions is measured more in comparative terms than in absolute. Over the past several years, the Technology Alliance has visited our competitor regions in the Silicon Valley of California; the Research Triangle in North Carolina; Boston, Massachusetts; and Austin, Texas. Each of

these places is working very hard to educate, attract and retain the best and the brightest people, because in a knowledge-based economy, having the smartest people is the most important advantage any region can have. Washington state can continue to be such a region, and an excellent educational system is the essential starting place.

Section
4

Report and Recommendations

The Task Force Process

The Technology Alliance, in collaboration with Governor Gary Locke and Superintendent of Public Instruction Terry Bergeson, convened in October of 1997 the Technology in Education Task Force, a group of two dozen educators, legislators, business leaders, and others with expertise and interest in the educational technology field. Marty Smith, partner with the Preston Gates & Ellis law firm, serves as the Task Force's volunteer chair. (A complete listing of Task Force members is on page two.) The Task Force worked for several months to shape a set of proposed action steps to accelerate the best uses of technology to improve student achievement in Washington's schools.

The Task Force conducted a study to gather data describing the current use of technology in Washington's K-12 public schools, surveying the state's 296 school districts in April of 1998. The results of this survey informed the work of the Task Force, are used throughout this report, and are extensively described in Appendix A.

The Task Force prepared background papers and recommendations on key technology topics, and convened a statewide conference on May 19, 1998 to discuss the draft recommendations with key leaders and stakeholders. The 275 attendees at this conference included 50 teachers from districts throughout the state, business leaders, educational administrators, legislators and community leaders. Speakers at the conference included Governor Gary Locke, Superintendent of Public Instruction Terry Bergeson, nationally recognized educational technology expert Cheryl Lemke, and several business and legislative leaders. The complete list of recommendations and the conference attendees' ratings of those recommendations is available in Appendix B.

Chris Held, who staffed the Task Force from December 1997 through June 1998, and is now with the Office of the Superintendent of Public Instruction, provides a compilation of best practices in school technology that is available in Appendix C. Lastly, a discussion of Public School funding issues related to technology is dealt with in Appendix D by attorneys from Preston Gates and Ellis.

Looking ahead to the rest of 1998 and into 1999, the Task Force will continue its efforts over the next year to serve as stewards and advocates for the implementation of its recommendations. The Technology Alliance has agreed to work in collaboration with the office of the Superintendent of Public Instruction to administer the technology survey annually over the next four years in order to benchmark the progress our state is making.

Section

5

Report and Recommendations

The Case for Technology in Schools

It's the Economy

Washington's economy is increasingly reliant on knowledge workers. Even fields traditionally viewed as non-technical, such as agriculture and forest products, now use a wide range of technical tools to stay competitive. Farmers use sophisticated computer systems to help them manage orchards and crops. Forest products companies analyze tree stands for maximum yields and minimum erosion using complex computer models. Hotels, clothing manufacturers and grocery stores manage their inventory with minute precision using automated tools.

Harvard economist Michael Porter noted during a recent speech: "There is no real distinction anymore between 'high tech businesses' and 'low tech businesses.' There are simply 'high tech' and 'low tech' ways of competing." He went on to say that the economies that succeed are the ones that figure the most efficient or 'high tech' way of producing and distributing the highest quality goods, whether it be apples or envelopes or airplanes. He noted that the only way to win at the "low tech' game is by having the lowest wages, and that is not a game we care to win. When cataloging the requirements of the 21st century workplace, almost every sector is requiring basic technological skills from even its entry-level employees.

What does this imply for our state's education system? Simply put, **access to technology tools and the skills and knowledge they develop is an essential component of a competitive school system**. **If our children are going to be competitive in a 21st century workplace they must have these skills**; and, in fact, excellence in this arena can give our children tremendous advantages. Ignoring technology or poor use of these resources leaves our children, and our state, behind. The wise use of technology is only one ingredient in a comprehensive program of education reform, but it is a key ingredient, and strengthens many of the other efforts to improve our schools.

In purely practical and immediate terms, there are approximately 450,000 thousand jobs in the technology sector in the U.S. currently going unfilled because there are not people educated and trained to do them. Over the next decade, fully one third of all new jobs created in Washington State will be in the information technology field. In King County alone, there will be 46,000 new jobs created between 1998 and 2005 in computer sciences, computer engineering and systems analysis. These jobs, and other high wage jobs in life sciences, aerospace, and electronics require employees who can think critically, solve problems creatively, work well in teams, and who are comfortable and familiar using technology tools.

For Washington's students to have a chance of participating successfully in the knowledge-based economy we are creating, our schools need to do an excellent job of preparing students for a technology-rich world. Washington has been a net importer of technology talent; we would like more of these jobs to go to current residents and their children. And, because a trained workforce is so critical, we are concerned that if Washington's schools do not provide graduates who are prepared for this emerging economy, technology business will expand or locate in regions that have done a better job than we have in providing a capable and motivated workforce.

What Are Technology Skills? Do They Really Help Kids Learn More?

If kids can communicate using the pencil as a tool, why go to the expense of putting computers in the classroom? Why have children spend hours learning to keyboard? Can't it at least wait until high school? Here are the reasons: Children are able to write more quickly once they have mastered keyboarding, so they spend more time on the content of their writing and less on the mechanics. Word processing programs allow them to edit their work much more quickly and easily, so children, with the guidance of good teachers, become better writers because they learn to rewrite and edit their work. Keyboarding on the Internet, they can email Grandma or have an instantaneous pen pal in New Zealand. They become facile with a tool that is used ubiquitously in the adult world of work, and enjoy the gratification of seeing their work produced in a professional manner, given the same amount of value as an adult's written product. As it has been noted, technology is like a bicycle for the mind, it enables you to go farther and faster than you ever could without it, but does not remove the need for expending mental energy to succeed.

A distinction needs to be made between technology skills and the improved learning that the use of technology can provide. When thinking about technology skills versus the learning it enhances, it is helpful to look at the kinds of things schools usually teach. In school small children learn the alphabet, and then how to write letters, and eventually make words and sentences. The mechanical part of this is penmanship—how to hold a pencil, how to make the letter 'B'. A child needs to memorize letters and learn penmanship skills in order to do the higher order thinking of composing a story or describing in words the world she sees outside her window. The first steps, or rote learning, develops skills that allow a child to eventually *communicate.* Similarly, a child learns to count, to recognize numbers, and eventually to add and subtract, and then to multiply and divide. The point of going through the rote learning of the mechanics of arithmetic is to be able to use math as a tool to *solve problems.*

The same analogy applies to technology skills. Children learn how to turn on a computer, to keyboard, to log onto the Internet, to manipulate a spread sheet, as mechanical steps that allow them to do many kinds of higher order thinking. The technology skills are not ends in themselves, they are tools that allow children to *communicate,* and to *solve problems*. The future dream, of course, is to make computers and other technology so easy to use, it will be no more difficult to learn the basic mechanics than it now is to turn on a television or make a telephone call. The more natural and easy use of these tools becomes, the more obvious it will become that these tools are means to ends, and not ends in themselves. And for children, these tools are not scary. The same or similar tools are part of their entertainment world, and

the world of friends and home. Who is the one at your house who knows how to program the VCR?

The point of learning these technology skills is to support and enhance students' academic achievement. Children learn to keyboard in order to write more clearly, more quickly, and with more confidence. They learn to use the Internet to do research and access information from all over the world; they use math software and learn spread sheet programs to solve real world problems. (An entire set of national educational technology standards for students called NETS has been developed by the International Society for Technology in Education.)

Can we demonstrate empirically that kids who have access to technology achieve more academically in a shorter amount of time? Not yet, though several national studies are currently underway. We do know that although business has been unable to easily quantify the benefits of technology, it has enough anecdotal evidence to make enormous commitments of resources to the process. Maximizing the benefits of information technology is a multi-stage process that occurs over a period of years. Schools are in the early part of this process and are experiencing the growing pains of this conversion.

The School as an Integral Part of a 21st Century Society

The whole world is getting wired. Offices, homes, libraries, hospitals, universities, hotels -- every institution in our society is transforming itself to respond to the information age. It seems decidedly wrongheaded to leave our most essential places of learning, our schools, out of this transformation. Of all places, our schools should be the ones at the *top* of the list for participating in the information age, not at the bottom. School, after all, is the place where information, and one hopes, knowledge, is transmitted.

Traditionally, public school has been the key place where the American ideal of equal opportunity has been attempted, if not always realized. Even though the costs of access to technology are dropping, many children will be left behind if they are not exposed to technology through their local public school. If we are going to prevent our society from becoming one of information "haves" and "have nots" we must commit to equitable investments in technology.

Schools, which traditionally have been institutions somewhat isolated from the rest of society, no longer need to be. This is particularly true of teachers, who have some of the most isolated jobs of all. Through technology teachers can communicate with parents, with peers, and deal with the administrative burdens of their jobs much more efficiently.

Schools are at the very early stage of using technology to enable administrative efficiencies, but the gains can be impressive. One school district in Washington figured it added 15 minutes of teaching time to each teacher's day simply by automating attendance-taking and the school lunch count. These administrative cost savings can offset some of the ongoing systems maintenance costs, and can potentially save districts thousands in administrative overhead.

Many kids will not stay in schools that they perceive are teaching them nothing they can use in the real world. Experience suggests that many at-risk youth, bored and disengaged from traditional classroom environments, can be kept in school longer through the creative use of technology.

The world that technology tools open is unprecedented, and frankly frightening to some people. Children can now have access to the best information resources in the world and can communicate directly with people all over the world. Technology allows kids to learn in fundamentally new ways, like the fifth grade class from Washington's Pacific coast that as a class project, compared marine life in their area with a fifth grade class from the coast of Maine. The ability to communicate quickly and inexpensively via the Internet provides learning opportunities limited only by our imaginations. Children can use technology to learn about the same things that have always learned about, but the real promise of technology is that it truly opens up whole new worlds. It is important to have adults guiding kids in this journey, so they learn to use these powerful tools with judgement and good sense.

Our children are bombarded by information and messages everyday –from electronic media, from peers, from billboards and magazines. Schools are the place where children can and should be taught to think critically, to make reasoned judgements, to explore new ideas and concepts. Rather than simply limiting the amount or types of information that our children receive, it is far better to help them thoughtfully and critically digest a wide range of information. Access to information is an essential element of a free society, but children need guidance in sorting through the available information. Obviously parents have a central role to play, but schools should also take on the job of preparing our children to be thoughtful-- and critical-- consumers of the information age.

Section
6

Report and Recommendations

Findings of the Task Force

Overview

Investing in technology in our schools does not simply mean buying computers. Those speaking to the need for modern technology in our schools have identified four elements required for the successful implementation of educational technology, which the President described as "pillars". These Four Pillars are:

- ✓ personal computers and other related **hardware**
- ✓ wiring classrooms and other learning spaces to the Internet, called **connectivity**
- ✓ **content** and curriculum development, and
- ✓ teacher training or **professional development.**

(The words outlined in bold describe what the educational technology community has come to use as the shorthand definition for each pillar.) Each of the pillars is necessary to support true improvement for education, yet the average person thinks of hardware, and perhaps a hookup to the Internet, as the only things necessary for success. Teacher training and content development are often neglected in the haste to buy "stuff." The need for ongoing maintenance and technical support also gets ignored or vastly underestimated. This is not surprising in such a new endeavor, but it has led to less-than-successful efforts in many of our schools, and has created controversy over the use of computers in those school settings. Ill-planned and under-funded efforts have led to charges of expensive resources being wasted or poorly utilized. In a climate of extremely limited resources for our public schools, wise use of all resources is essential. This is especially true of the technology area, which is extremely capital intensive.

In order to improve the understanding of the need for an integrated and planful approach to technology deployment in the schools, a national group of technology executives, the CEO Forum on Education and Technology, has further delineated what the four pillars mean and has created a "STaR Chart" for assessing School Technology and Readiness. The CEO Forum is conducting an annual bench marking of America's schools over the next four years in hopes of measuring their movement from "Low Tech" through "Mid Tech" and "High Tech" to an ideal level they call "Target Tech."

What is Target Tech?

Target Tech is the successful culmination of integrating technology into schools in a manner that improves students' education. Target Tech classrooms foster significant student academic achievement. In terms of hardware, the CEO Forum defines it as 2-5 students per regular computer and 3-8 students per multi-media computer. It means continual maintenance and technical support at every school site. In terms of connectivity, it means a high speed dedicated line, so that students and teachers have fast reliable access to the Internet. In terms of curriculum and content it means easy availability of quality applications and subject matter software, research resources, and the capacity for student-centered project-based learning. In terms of professional development, it means teachers who can use technology tools to access and design curriculum appropriate to their students; use technology to communicate with parents, students and colleagues; and who can use technology as a personal productivity tool.

How Are We Currently Doing in Washington State?

Pillar I – Hardware

Regarding hardware, there is both some good news with the bad news that was evident in the results of the Task Force's survey. We have a fairly good ratio of students to personal computers in this state, with 4 students per personal computer at the high school and junior high level, and 5 students per personal computer at the grade school level. The bad news is that many of these personal computers are frankly obsolete, and there is often no one available to maintain them when they crash, which older machines frequently do. Currently, 58% of the computers in use in Washington's K-12 public schools were purchased before 1994, which means that the vast majority of these computers are not able to use multimedia resources or work on a computer network. This severely limits what teachers can do instructionally with these devices. Currently, there is only one "networkable" computer for every 13 students in our state.

Business professionals are often shocked when they learn of the conditions under which almost all of our school technology professionals and teaching staff operate. For instance, a typical technical support professional in a business setting will support about 40 personal computers. Even in the most well-funded school districts, a typical tech staff person is supporting over 350 personal computers! It is no wonder that computers in our schools may sit, unusable, for days at a time waiting for service. Our survey results indicate that only 14% of our school districts can meet a "down-time" of two days or less for a classroom computer, and that 30% of our school districts have no "official" maintenance staff at all. The teachers who do have access to computers often have only two choices: either learn to fix and maintain the equipment themselves, or simply not use it. Not surprisingly, many of today's teachers are reluctant to use technology unless and until they are sure it will work reliably. Often the "solution" is to allocate a portion of one teacher's time to supporting technology in addition to his or her teaching load. While this may be all a district can afford, it is an extremely inadequate solution, and perpetuates the misplaced notion that a sophisticated user is synonymous with

technical professional. Until we fund technical support staff adequately, schools will not be able to make the best use of the technology currently available, let alone the new resources that will become available in the future.

To complicate the problem, the national shortage of information technology professionals could dramatically and adversely affect our schools just at a time when they need high quality professionals to design and maintain state-of-the-art information systems. This problem is likely to be dramatically exacerbated over the next four to five years if we do not take steps now to correct it. In today's market experienced people in the technology field are in high demand. Systems designed by inexperienced people tend to work poorly and require expensive fixes. It is cheaper in the long run to pay for the best people we can afford in this area. Schools are currently handicapped by strict rules regarding pay scales for their technical staff and they often cannot attract qualified applicants at the salaries they are able to offer.

In any discussion of the Hardware pillar, it is important to remember that technology tools are not limited to personal computers. More than one teacher has made the case for a telephone in the classroom as the most useful and important technological advancement they would like to see deployed in their school. In addition, the television, video camera and video cassette recorder have transformed many classrooms and have great potential to impact student learning, especially given the video capacity of the K-20 Network.

Pillar II – Connectivity

Of the four pillars, the most progress has been made in the area of connectivity**,** but even there we have a long way to go**.** Washington state has made a commitment to invest over $60 million in the "K-20 Network", the state's own high-bandwidth educational network, linking schools that educate students from kindergarten through graduate school. To date, every four-year public college, university and branch campus, all community and technical colleges, and the nine educational service districts have been connected to each other with high-speed Internet and video conferencing capabilities. Over the course of the next eighteen months, every one of the state's 296 school districts will also be connected to the network and have communications access to every other institution in the K-20 network. The K-20 network is governed by the Telecommunications Oversight and Policy Committee (TOPC), composed of representatives of the Governor, the Legislature, the Higher Education Coordinating Board and the Superintendent of Public Instruction.

At the local level, school districts and buildings, because of differing resources, priorities, experiences and outlooks, have placed varying degrees of emphasis on connecting teachers and students to online resources. However, the promise of the K-20 network has served as an incentive, and our survey shows that 63% of Washington's K-12 public school instructional spaces now have a direct link to the Internet. Additionally, 85% of our schools have a least one local area network (LAN) and 76% of our schools have at least one dedicated data line. That is a remarkable achievement in a short amount of time, and demonstrates the willingness of local districts to find matching resources when the state leads the way. That said, many schools do not have high speed lines, and it will take a great deal of local investment to

get those schools literally "up to speed." Lastly, there are still 5% of our school districts (representing 6,000 students) that have no Internet access at all.

Federal, state and local policies each have an impact on the use of communications networks in our schools. At the federal level, the 1995 Telecommunications Act broadly reformed nearly every sector of the telecommunications industry. Companies that previously had been restricted to providing either local or long distance service can now compete in new markets. Firms providing local telephone service are required to make a package of universal telecommunications services available to customers at an affordable price. Most important to the educational community, schools and libraries will be eligible for discounts of from 20% to 90% on telecommunications and network infrastructure purchases, with the largest discounts going to those in the most economically disadvantaged areas. While the federal universal service discount, or e-rate, is still the subject of litigation, the large majority of school districts in Washington state have made applications for discounted services and expect to receive the reduced rates in 1998 or 1999.

Pillar III – Content

The Content and Curriculum pillar is best understood by beginning with three key definitions:

> ***Content*** is defined as the substantive material used to teach subject matter. Examples of content are: a story read out loud; a novel assigned for independent reading; a current events newspaper article for Social Studies; a map; a math problem set; a history textbook; a software program with math puzzles; a web site on the rainforest.
>
> ***Curriculum*** is a collection of content, together with lesson plans, activities and other processes, organized into a scope and sequence that constitute the plan for achieving educational objectives. One can talk narrowly about the fifth grade science curriculum, or the overall K-8 math curriculum, or more broadly about the overall curriculum required to be completed in high school.
>
> ***EALRs*** are the Essential Academic Learning Requirements. This is the term Washington State uses to describe what children in our state should be able to achieve, know and apply at certain defined milestones as a result of their schooling. They are objectives that the content and curricula should be organized to achieve.

In Washington state, the use of technology to develop and deliver content and curriculum varies enormously from school to school, and from classroom to classroom within a school. The technology-in-schools movement has been led by a few teacher-pioneers, often called "early adopters" who have found a variety of ways to get kids excited about learning through the use of technology. Some of these teachers have now been using technology with kids for a decade or more and have been able to do very sophisticated and exciting things that significantly advance student learning. (For a further discussion of best practices, see Appendix C: Best Practices: Top Ten List of

Model Programs.) In some schools, the few computers they do have may sit idle or broken much of the time. For many other schools, computers are used entirely for simple drill and skill practice. While drill and skill practice has its place, most educators would argue that this is not the highest and best use of an extremely powerful machine. These same machines are being used by students at other schools (or in other classrooms at the very same school) to do original research, develop complex projects, or communicate with experts from around the world.

The challenge for our state is to develop curriculum that is tied to the EALRs, as this is how our children, their teachers, school administrators and the public will measure success over the decades to come. These standards have created a wonderful opportunity for communication and collaboration among teaching professionals. Because we have agreed upon standards, there is an added incentive to develop curriculum in one school setting that can be shared easily, through the use of technology, to other schools around the state. Moreover, the expanded use of technology by both teacher and students alike, holds significant potential to assist our educational system in producing students that meet the EALRs.

Pillar IV – Professional Development

One little known fact about public education is that about 50% of America's current teachers will be retiring over the next ten years. A recent study the National Council for Accreditation of Teacher Education (NCATE) noted that "Two million new teachers will be hired over the next decade. As technology moves from the periphery to the center in K-12 schools, so must it move from the periphery to the center in teacher preparation. But if teachers don't understand how to employ technology effectively to promote student learning, the billions of dollars being invested in educational technology initiatives will be wasted." Our discussion of professional development falls into two distinct areas: "Pre-Service" or the training teachers receive they prepare for the profession in college; and "In-Service" or the training teachers receive after they have graduated and begun their professional careers.

Pre-Service Issues. Critiques of performance in training new teachers generally focus on three areas. First, some educators of teachers do not sufficiently model appropriate use of computers for instructional purposes, either in courses or field experiences. Second, many teacher education programs do not, typically, incorporate technology across their own curriculum, let alone the curriculum that these new teachers to be will take into their classrooms. Third, the instruction that is provided to pre-service teachers tends to focus more on the older and simpler instructional applications of computer technology (e.g., computer assisted instruction, word processing) and less on exposure to and practice with newer, more sophisticated tools (e.g., electronic networks, integrated media, problem-solving applications), which support development of students' higher-order thinking and problem-solving skills.

To what degree are higher education institutions meeting their responsibility for preparing tomorrow's classroom teachers? Bluntly speaking, a majority of our teacher preparation programs need to make substantial improvements in this area. Few colleges of education have identified or allocated the funding required to reshape their

curriculum to integrate technology in meaningful ways. Not using technology much in their own research and teaching, teacher education faculty often have insufficient understanding of the demands on classroom teachers to incorporate technology into their teaching. Many do not fully appreciate the impact technology is having on the way work in today's classroom, let alone today's business is accomplished. Often, they undervalue the significance of technology and treat it as merely another topic about which teachers should be informed. As a result, many colleges and universities are making the same mistake that was made by K-12 schools in the early year of the technology-in-schools movement; they treat "technology" as a special addition to the teacher education curriculum – (requiring specially prepared faculty and specially equipped classrooms) but not a topic that needs to be incorporated across the entire teacher education program. Even when college teaching programs understand how to approach this topic successfully, funding constraints severely restrict what can be done. Current college faculty require training in technology even more critically than public school faculty do, since each year they are training literally hundreds of teachers entering the system, all of whom need these skills.

It simply makes no sense to be preparing tomorrow's teachers for yesterday's classrooms. It is important to remember that the costs of training teachers in the effective use of technology *after* they graduate is much more expensive than including it in their college education. It sets us up for having to use public dollars to devise expensive fixes to an avoidable problem**.**

In-Service Issues. In 1992, nearly 75% of the teachers in Seattle Public Schools had never touched a computer. Seattle, however, wasn't unique, or even unusual. In 1994 only 28% of that Washington's teachers had at least nine hours of instruction in educational technology. To move beyond the most basic, "low tech" uses of technology, the CEO Forum's STaR Chart indicates teachers need more than thirty hours of training.

Many of Washington's teachers have now developed basic productivity skills. They can word process a letter to parents, create a quiz or make a grade book. But they still ask, "How do I use a computer in ways that enhance students' academic achievement and keep them interested in learning?" In survey after survey, the vast majority of teachers indicate that they need more training if they are to use technology effectively in the classroom. Teachers need training that focuses on how to integrate the tools into their daily classroom activities. Studies by Apple Computer, McKinsey and others have concluded that it takes four to five years for a teacher to use technology in ways that would match the "Target Tech" standards.

Public K-12 schools across the state have struggled to provide teachers with technology training and they continue to look for ways to systematically address this need. Many schools and districts have developed a process to provide productivity training for teachers. When it comes to the focus on integration of technology into the curriculum the approach is less systematic.

More often than not the model for curriculum integration training focuses on identifying "early adopters" of technology to offer training to other teachers. They are the teachers who had technology skills and found ways to enhance their curriculum through the use of technology. Schools have relied on their early adopters to champion the use of technology by providing a model and training for other teachers in the building. If these

technology missionaries are unable to persuade their colleagues to use technology, there is no real incentive for teachers to take the time to learn how to use technology effectively.

Principals frequently have few skills in the use of technology and no experience with how technology can strengthen learning and teaching in general, let alone school administration. Without these skills and understanding, it is rare to see a principal establish the expectation that teachers integrate technology into their classroom. Nor is it likely that they would devote time or other resources to teacher technology training. Teachers are left to find their own incentives to use technology. There are hundreds of teachers across this state who have found those incentives and who are using technology effectively in their classrooms. But a larger number face a series of challenges.

- ✓ It is difficult to pull teachers out of the classroom during the school day for any type of training; training tends to occur after school or on Saturday. For many teachers neither approach works.

- ✓ It takes time for teachers to write or rewrite lesson plans that effectively include technology. In a recent study, the Presidential Commission on Technology concluded that the absence of time to incorporate technology into their curriculum is one of the largest barriers to the integration of technology.

- ✓ Too few schools or districts have a systematic and systemic plan to bring technology into all of a school's classrooms within the next five years. There has been no clear leadership in the state or the country to provide them with direction.

Universities have key roles to play in researching the most effective methods of integrating technology into K-12 curriculum. Few resources have been allocated to researching the best uses of technology tools, and educators have had to learn by trial and error. Similarly, teacher education programs benefit from bringing the best professionals currently using technology in the classroom into universities to strengthen their current teacher preparation programs.

In an informal review of Washington's teacher preparedness programs, the Task Force's view is that we are probably doing no worse than any other state in preparing our teachers, and in fact there are some fairly innovative programs for K-12 teacher preparation and training in our state. For example, the University of Washington has developed several initiatives through its K-12 Institute aimed at in-service teachers that show real promise. Western Washington University has developed some models, and there are other isolated examples of innovation at various institutions around the state. That said, doing no worse than anywhere else is no endorsement. The lack of appropriate teacher preparation is an enormous *national* problem. We need to vastly improve both our pre-service and our in-service professional development if we are to truly realize technology's promise.

Integrating the Four Pillars into a Technology Plan

Creating an environment where teachers truly integrate and use technology as a tool for teaching, communication, and personal productivity, and students integrate technology effectively in their daily learning, requires an enormous amount of coordinated and thoughtful effort on the part an entire educational system. That is the vision of a school that is truly "Target Tech." This comprehensive effort takes significant expenditures of time and money wisely spent. The results are schools where kids are excited about learning, teachers feel supported and in touch with parents and colleagues, and the administration provides efficient management and motivated leadership.

The CEO Forum estimates that only 4% of the nation's classrooms are currently at the Target Tech level. Washington has some great individual examples, but our Task Force's educated estimate is that less than 5% of our state's classrooms currently meet the "Target Tech" standard.

Our survey indicates that 95% of school districts have some sort of technology plan, but only 14% have 90% or more of the funding identified to implement their plans. If fully implemented, these plans total approximately $604 million to be spent over the next four years, or $759 per student. Technology plans vary widely in their comprehensiveness. While 64% of the plans include a 5-year depreciation and replacement program for equipment, that means that over one third of school districts have not built in to their budgets a planned means to replace equipment.

Most school districts in our state prepared Technology Plans in the fall of 1997 in order to qualify for the e-rate described in the connectivity section. As noted above, few of these plans reflected a truly integrated approach that kept all four pillars in mind, and considered such issues as system maintenance, replacement of equipment, training administrative and instructional staffs, and the many complexities a comprehensive technology program requires. Few schools are yet to the point of fully integrating their curriculum to the state's EALRs, or can provide comprehensive technology programs that really support student achievement.

Funding Technology in Washington State

A key topic, which cuts across all others, is the issue of technology funding. The Task Force was extremely interested in finding out the answer to **four key questions: How much is being spent by school districts around the state on their technology programs? From what sources are they finding this money? How equitable is technology funding, district to district? And lastly, how wisely is this money being spent?**

How Much Have We Spent? The 226 school districts that responded to our survey reported that they are spending $107 million on technology during the 1997-98 fiscal year. Pro-rated, statewide technology spending at the school district level will be $132 million in the 1997-98 fiscal year. This translates to an average of $133 per student. Reported expenditures range from a low of five dollars per student to a high of $650 per student.

From What Sources Did the Money Come? It is obvious to the reader by now that funding educational technology is problematic for many school districts. Most school districts do not have nearly enough funds available for their technology needs in their basic operating budgets, the portion of the budget every school gets from the state appropriation which is theoretically supposed to fund the "basic" school budget. Realistically, no district can operate solely on this money, hence the annual school levy and the occasional school bond put before local voters to be funded with local property taxes. Another source, federal funding, has helped some schools supplement their technology budgets, but it is not a significant source to most districts.

A common source of technology funding is through a capital bond or levy. School districts that can pass a capital bond or levy for technology often end up relying on those sources for most of their technology funding. Capital bonds and levies have some major limitations as funding sources, as school district interpretations of state laws have tended to limit these expenditures to initial hardware purchases, or to hardware bundled with pre-installed software. This often means that important needs such as staff development, maintenance and technical support are inadequately funded or not funded at all. Many school districts in economically depressed regions are not able to get voter approval for local bonds and levies at all, typically leaving them without any ability to obtain technology resources for their classrooms and students.

A new source of money to school districts comes from a fund designated by the legislature with the cooperation of the governor. This fund provided $19.5 million in school technology grants in 1997 and the another $19.5 million in 1998. Looking ahead, this resource is potentially a significant source of new funding for technology programs for many years to come, but the legislature must continue to authorize this money. Lest we think this source will solve the technology funding problem, the McKinsey consulting company estimates that schools should be spending 4% of their annual budgets on technology; a presidential panel on the topic estimates 5%. Using the lower figure would translate into over $275 million of spending on technology in Washington state schools. Clearly, $20 million spent annually will provide real help, but it will not get the job done.

Philanthropic donations to schools for technology often get publicity, leading some to believe that corporate and private philanthropy will be a primary funder of school technology. One can see by the data outlined below that private giving represents only a tiny portion of a typical school district's spending on technology (Less than 2% according to our survey.) While important to individual schools, private giving is not a significant overall source. Unfortunately, all to often, grant moneys or private gifts of technology to our public schools take place with little advance planning that takes account of all four of the requisite pillars. While given with the best of intentions, these private gifts sometimes create more problems than they solve. A gift of computers without appropriate planning for teacher training on their use, or maintenance and support of the computers, does not assist the receiving district. Similarly, gifts of software without requisite training or support can reduce the effectiveness of the asset.

Understanding that technology programs are chronically under funded, even in many prosperous areas of the state, it is still useful to look at the mix of funding sources Washington schools use to fund technology. In our survey, districts reported the

following average mix of 1997-98 funding sources for their educational technology programs:

District Operating Budget	40.6%
Capital Bonds & Levies	31.6%
State and Federal Grants	20.2%
Title 1 Federal Funding	5.7%
Other	1.7%

Clearly, this is another indication that districts that cannot pass a capital bond or levy are at a distinct disadvantage, as nearly one third of a "typical" technology program is funded through this source. Nationally, about 70% of the average public school technology budget comes from state sources. So, while the state should be applauded for its visionary work in funding the K-20 network which provides important infrastructure, it is actually far behind the national average in technology spending at the school district level.

How Equitable Has Our Funding Been? Important and disturbing disparities result from the wide range in property values in our state. In Washington, the assessed property values on a per pupil basis range from a low of $39,490 per student in one school district to a high of over four million dollars in one small district with very high values and very few children. Even when the extremes are disregarded, there is enormous variation district to district. For example in Bremerton, the per pupil value is $271,619, whereas just east across Puget Sound on Vashon Island, the value is $559,619. And just east across Puget Sound from Vashon in Seattle, the assessed property value per pupil is $958,199. Obviously it is much harder to pass a levy in a district with low property values, because it takes a much higher tax increase to raise the same million dollars in Bremerton as it does in Seattle. Consequently, it is not surprising that Bremerton has never passed a technology levy, and in fact often cannot pass its regular maintenance and operation levy, while Seattle has passed several tech levies (although not all.) Bremerton is spending $10.47 this year per student on technology; Seattle is spending $107.73. Our study shows that per pupil spending on technology is correlated to the property values of the district; the higher the property values, the higher the technology budget.

Not passing tech levies is a significant problem. Of the districts we surveyed, 26 had failed every tech levy they had tried to pass over the past five years. These districts represent 14.4% of the students in the survey, or nearly 150,000 children in our state.

The most comprehensive---and the most politically controversial---solution, would be to redefine basic education to include technology. Washington state's constitution provides that it is the paramount duty of the state to make ample provision for the "basic education" of all children in the state. The state Supreme Court has defined basic education as including "all instruction and discipline intended to enlighten the understanding, correct the temper, and form the manners and habits of youth, and fit them for usefulness in the future." As noted by the Supreme Court, basic education was "to equip our children for their role as citizens and as potential competitors in today's market as well as in the marketplace of ideas." The state's 1979 Basic Education Act mandates specific course offerings as a part of basic education, including

course offerings such as reading, language arts, languages other than English, arithmetic mathematics, social studies, science, music, art, health, physical education, and traffic safety. The Supreme Court in 1982 subsequently expanded the definition of basic education to include transportation, handicapped, bilingual, and remediation programs. The pressure is building for technology to be added to that definition. One potential source is NERC (Non Employee Related Costs) funds, which are allocated by the legislature as part of the basic education package. If technology is considered to be part of basic education, then it can and should be included in NERC. Money from this source could be used for purchasing and replacing computer hardware and software, network purchases and maintenance, connectivity costs, and other non-employee related expenditures. (For a further discussion on school funding for technology see Appendix D: Funding Technology: Traditions and Innovations.)

How Wisely Have We Spent Our Money To Date? No one will defend every technology expenditure by every district, and anecdotal evidence points to several mis-steps as schools deploy technology. Frankly, in reviewing the patched together funding sources, the outdated equipment, the inadequate software, the lack of training for teachers and principals and the lack of technical support staff, the truly remarkable story is how well most of the money *is* being spent. It is the rare business that could use technology to be productive under the conditions in which the average school operates.

Section
7

Report and Recommendations

Conclusions

Imagine a business where only one out of five employees had access to technology, where computer systems were often not connected to a network, where employees in some locations had access to the outside world via the Internet and other employees in similar positions did not, and where virtually none of the staff received adequate training. No business would accept this model for long, and our schools should not have to operate this way any longer.

Technology, when integrated into school settings thoughtfully and systemically, has the potential to significantly impact student academic achievement. This process is not easy, nor inexpensive. But when it is done well, the rewards for children—and their parents and teachers—is significant. Current spending on technology is clearly inadequate, and the spending that is occurring is often determined by the vagaries of funding mechanisms rather than what a school district would like to do if it had more control and flexibility in respect to its finances.

This report has sought to explain the current state of technology programs in Washington's schools and to make the case that the potential outcomes from improving our investments in this effort make it worthy of the public's support. While it is easy to get caught up in all the "techy talk," substantially improved student academic achievement is the sole goal of this effort. Our hope is that having described the current state of school technology, and the positive benefits strong technology programs provide for students, the reader is now convinced that significant state resources should be identified for this effort.

Unfortunately, given the substantial expenditures required to establish a competent technology program in a typical school district, the intractable obstacles of state funding limits, *and* the widespread inability to pass levies, there does not appear to be any ready or simple solution which will achieve the realization of the benefits of technology in our public education system on a statewide basis. New means of funding not currently in place will need to be identified for al of our state's children to achieve the educational benefits technology can bring.

That said, those of us in the business community who have experienced the length of time it took between our initial investments in technology and the productivity pay offs many of us are now experiencing tend to feel cautiously optimistic about our schools. Schools can learn from some of the business community's experiences, and can benefit from the billions business has spent over the past decade or more, much of which hindsight indicates was less than brilliantly allocated. We are thankful that schools can benefit from less expensive hardware, newer and more powerful networks, and the explosion in telecommunications

bandwidth that is coming over the next few years. Granted, the rate of change accelerates ever more rapidly, but there are strategies that can be employed to make this transition less painful and less expensive than it might be.

Business has poured billions into learning how to manage itself in new ways, using technology to organize work projects in innovative ways, to become more efficient, and more responsive to customers, suppliers and employees. Technology has both made this change possible and forced the change to happen even in organizations that resisted mightily. Schools are undergoing a similar metamorphosis, from centrally managed bureaucracies to more de-centralized learning communities. Technology will first make this change possible, and then the resulting changes will force new changes to occur. We can fight this change; do it badly, inefficiently and inequitably; or we can do it right. It is going to happen eventually, and we are early enough in the process to do it wisely and well. The following are our recommendations:

Section

8

Report and Recommendations

Recommendations of the Task Force

1. Computers Alone Are Not Enough

Acquisition of computer hardware must be integrated with all the other component pillars in order to insure that technology will work successfully in school settings. Included as part of technology acquisitions by schools must be a plan for hardware and system maintenance; connections to the Internet; training teachers and other professionals both on the general use of the technology and its use in the instructional process; appropriate electronic curriculum; and the ongoing funding of all the foregoing. Schools should spend money on new computers after they have an integrated multi-year plan that includes all of the elements listed above. Current funding mechanisms, which do not support an integrated approach, need to be changed.

A) We strongly encourage the Superintendent of Public Instruction, the Educational Service Districts (ESDs), the professional associations, local school boards and others who have served as partners in this effort to provide the guidance and resources to help schools and school districts design more useful and comprehensive technology plans, that will serve as real guides for the wise allocation of resources.

2. Investing in People Is Essential

The lack of professional development for teachers is the biggest unmet need in the current state of technology in education in Washington. Lack of training for school administrative leadership and lack of technical support in schools run a close second.

A) OSPI, with the support of the Legislature, and the cooperation of the Governor's office, the ESDs, and the professional associations, should develop and disseminate to teachers lesson plans and other guides to the best uses of technology in the classroom. Staff training in technology use needs to get a substantially larger portion of in-service training budgets. A well-developed and well-supported peer training model is the best approach to training teachers in the classroom use of technology. It is the most welcomed by teachers, the most cost-effective, and trains the largest number of individuals in the shortest period of time. A well thought-out, thorough, state-wide program will use teacher training as a way to develop timely digital curriculum that supports the state's EALRs, and will create electronic peer support groups to provide follow-up help to newly trained teachers. We recommend the formation of a web site juried by master teachers that contains the best teacher-designed electronic content and curriculum tied to the state's EALRs. This website should be linked to the other innovative curriculum websites from this and other states.

B) A comprehensive professional development program in educational technology should be established for principals and superintendents. This program should include guidance on the most effective uses of technology in classrooms, the funding of technology in schools, and the support of teachers as users of technology in instruction. Changing and supporting a new kind of learning environment for students and teachers must begin with the leadership of our public schools. There are 296 school superintendents and 1760 public school principals in our state. Many of these individuals have received very little training in using technology as a personal productivity or management tool and virtually no training in leading an effort to adapt their instructional settings to the effective use of technology. A comprehensive program designed for school leaders is needed to jump-start this transformation on a statewide basis.

C) Our state's teaching colleges should review and revise their teacher training curriculum so that it is more responsive to both ongoing education reform and to the use of technology in the educational process; this should occur without delay. The State Board of Education should work with the state's teaching colleges, professional associations, the Task Force, and others to define new standards for colleges of education by the end of 1999. To encourage innovation, grants should be made available to colleges that develop model programs. Teaching colleges failing to make reasonable progress on implementing new standards should not continue to receive state funding after 2003.

D) The state staffing formulas for public K-12 schools should be increased to provide an adequate budget for schools to hire lead technology staff and technology support staff. The state should immediately examine changes that can be made to current hiring practices, in order to allow our schools to hire and retain the absolute best people we can possibly afford in all the key technical jobs. Precedents have been set for paying market rates for professional such as architects and attorneys working for large districts, although these people are usually consultants, and not fulltime employees. Still, a similar rationale can be applied to the hiring of technology staff, particularly those in lead jobs who are designing systems and in charge of allocating resources.

3. Funding Priorities for Technology Must Be Addressed and Done So on a Statewide Basis

An integrated, statewide approach to funding technology in our public K-12 schools is urgently needed to improve the overall effectiveness and fairness of current and future technology programs. Current funding for technology in Washington's public schools is inadequate and inequitable and comes from a confusing hodgepodge of sources. Key statewide infrastructure investments have already by the state. These infrastructure investments now need to be followed up with a wise use of increased funding to assist all of our K-12 public schools in their use and integration of technology into the educational process.

A) The Education Savings Account or Fund 291 is an important statewide resource for technology in the classroom and needs the ongoing support of the Legislature. The State's Incentive Savings program and the money this program makes available to our schools for funding technology in the classroom, is an important resource for our schools and deserves the continued support of the Legislature. These funds should be used to support integrated programs as described in this paper. Special consideration should be given in the allocation of these funds to districts with lower than average property values. The acquisition of hardware and the enabling of connectivity are very difficult issues for many of our public school districts. The state's Incentive Savings funds can be of great help to many of the less fortunate districts, provided a district's use of the funds occurs as part of an integrated approach to incorporating technology into their classrooms.

B) The definition of "basic education" needs to be updated to include technology. NERC (Non Employee Related Costs) funding needs to be increased to address the impact of technology expenditures. Access to technology will soon be regarded as every Washington public school child's right, rather than as the privilege most view it today. It is now time for the Legislature to include technology in the basic education formula, and to provide adequate funding for the same. A 5% increase in NERC represents is the minimum necessary to make a measurable difference for the basic operations and maintenance of computer hardware and systems, and to provide money on an ongoing basis to replace obsolete and outdated equipment.

C) Private philanthropy from foundations and businesses should support technology projects and programs in our K-12 public schools that take an integrated approach, addressing all four pillars. Private contributions to technology in our classrooms need to be part of a comprehensive and thoughtfully planned program that makes sure that all of the required elements are present in order in to insure success. Private philanthropy can play a key role in helping develop model programs, but it can also exacerbate problems if the money is not wisely spent.

4. The Challenge Requires Leadership at the State Level

Some part of official Washington state is going to have to make the effort to see that the tools and training we need are provided. Fundamentally, this is a local problem because of the way our schools are financed in this state. Technology in the schools is not going forward where levies fail. Notwithstanding this essentially local condition we believe that the necessary ingredient is state leadership. The cost is substantial and the need is not yet clearly seen. Overcoming obstacles, energizing the education community and persuading citizens at large must be done at the State level. Such a situation presents the classic case for someone to assume the responsibility to develop statewide a vision of what is possible here and to carry forward to that vision's realization.

The Office of the Superintendent of Public Instruction has, wisely, put on its staff an experienced teacher who is expert in utilizing technology in the classroom. This step bodes well for the future effectiveness of this office. One might speculate that in that

office the challenge would be felt sufficiently that the leadership would be forthcoming. We do not intend to simplify the challenge. Local problems, state problems and funding problems all have to be overcome. The breadth and complexity of the undertaking suggest that, despite our promising head start, we could easily end up with an inadequate, spotty result.

The Task Force believes that sound leadership could develop and activate an effective mass of support at the private level from community organizations and from the business community. If we can build, simultaneously, a new professional stadium for both our baseball and football teams, there should certainly be a way to obtain for our public school children the best of modern educational experience.

These recommendations represent the synthesis of several months of work by the Task Force. This is by no means an exhaustive list. In fact, in Appendix B contains a list of 24 specific recommendations that were reviewed and endorsed at the Task Force's May 19th conference. These include specific action steps to guide OSPI, the governor's office, the legislature, local school boards, the business community, and local voters----anyone who provides resources and cares about schools----as they make spending and technology plans over the next four years.

Section

9

Sample Survey

April 1998 Technology Survey for Washington Public School Districts

PLEASE FAX COMPLETED SURVEYS TO THE TECHNOLOGY ALLIANCE
FAX: 206-389-7288. SURVEY DUE ON APRIL 17.
Questions about how to complete the survey? Call Chris Held at the Tech Alliance:
206-389-7261 or email Chris at chrish@technology-alliance.com

Name and Number of District: _____ _____

Your Name _____ Title _____

Phone _____ E-mail _____

1. Does your district have a long-range technology plan? YES☐ NO☐

2. If you answered NO to #1, skip this question. If you answered YES:

(A) What is the total cost of your plan? $_____ over _____ years.

(B) In your opinion, what percentage of the funds needed to support this plan can you reasonably assume are or will be secured? (Circle one.)

a. 0%-10 b. 11%-25% c. 26%-50% d.51%- 75% e. 76% -90% f. 91%-100%

(C) Does your plan include a program for:

- Training teachers in the use of technology? YES☐ NO☐
- Assisting teachers with integrating technology into the curriculum? YES☐ NO☐
- Depreciating and replacing equipment in a 5-year-or-less cycle? YES☐ NO☐

3. What would you estimate is the current amount spent annually in your district for technology? (Please include spending for hardware, connectivity, staff development, maintenance, personnel, & software) $_____. What percent of that annual technology expenditure comes from each of the following budget categories? (Just give your best estimate. The total should equal 100%.)

a. Title 1 _____% b. Grants _____% c. District Operating Budget (less (a) & (b)) _____% d. Bonds & Levies _____% e. Other _____%

4. Please complete the following chart **as best you can** for your district. Educated estimates/rounded numbers are fine for our purposes:

Basic Demographic Data			School Internet Access (Instructional)			Net-working	Computers	
A. # of students in grades:	B. # of schools	C. # of class-rooms & portables	D. # schools with dedicated data line[1]	E. # schools with dial-up Internet access	F. # class-rooms with Internet access	G. # schools with local area network[2]	H. # compu-ters in use	I. # recently-acquired computers[3]
K-5 #								
6-8#								
9-12#								

[1] Connection to WEdNet or other direct network connection - NOT dial up.

[2] For purposes of this survey, please count a school as having a local area network ONLY if at least 75% of classrooms have computers connected to the network (OR have network outlets).

[3] Please count only those computers that were acquired since 1/1/94.

5. How does your district deal with the technical maintenance and/or technical support of hardware and networks? (Circle a, b, c, or d.)

a. No official maintenance plan in place; done by teachers, staff and students on their own time.
b. District level technical support staff services several schools.
c. At least 0.5 FTE technical support at each school.
d. Full-time equivalent technical support in each school.

6. Assuming an "industry standard" for hardware and network repair of two days or less in "down time", what percent of the time is your district able to meet this goal? (Please give us your best guess.)

a. 0%-10 b.11%-25% c. 26%-50% d.51%- 75% e. 76% -90% f. 91%-100%

7. Technology Capital Levies and Bonds - To help us understand how Washington school districts are funding technology, we would like to know about ALL technology bonds or levies (or capital levies with technology components) on which citizens of your community have voted since 1993, (even if voters did not approve the bond or levy). Please list any bond or levies below (NOTE: If you included technology expenditures as a part of a larger capital bond or levy, please indicate the amount of the bond or levy that was designated for technology.)

	A	B	C	D
	Year	**Bond or Levy Amount** (in millions)	**Did it Pass?** (yes or no)	**$$ Amount dedicated to technology** (in millions)
	(example) 1994	*$2.3*	*no*	*$.8*
1				
2				
3				
4				

8. In your opinion, what are the most pressing issues your district is facing related to the effective use of technology in the classroom?

9. Are there any technology success stories from your district you would like to share?

PLEASE FAX YOUR SURVEY TO 206-389-7288 by April 17, 1998Thank you very much for taking time to complete this survey, which will be compiled and presented at a statewide summit on May 19, 1998.

Appendix

A

STATE OF THE STATE

AN ANALYSIS OF TECHNOLOGY IN WASHINGTON SCHOOLS

Smart Tools for Tommorrow's Schools Executive Summary September 1998

By Martha Ann Cepress

Overview

In April 1998, the Technology Alliance mailed a fax-back survey to Washington State's 296 school districts. The survey had two goals: to provide a snapshot of the status of technology in public schools and; to build a reliable source of data that will enable educators and decision-makers to track progress, measure success, and identify areas in need of improvement over time. (This survey will be used in subsequent studies sponsored by the Technology Alliance and conducted by the Office of the Superintendent of Public Instruction).

To this end, the survey included questions regarding spending, sources of funding, technology plans, "connectivity" and hardware demographics, bonds and levies, and also provided an opportunity to share both pressing issues as well as success stories. A copy of the questionnaire distributed to the school districts can be found at the end of this report.

In a concerted effort with the Office of the Superintendent of Public Instruction (OSPI), the Technology Alliance achieved a response rate of 78 percent, or 227 districts.[1] These districts represent approximately 82 percent of the state's students.

Data from the responding districts, including "poverty variables" such as per-pupil property assessment, and percentage of participation in a free or reduced lunch program obtained from OSPI, were then compiled and analyzed. The results of these analyses can be found within the subsequent six sections of this Executive Summary: Key Findings, Funding and Expenditures, Demographics, Equity, Pressing Issues, and Success Stories.

For simplicity, some analysis was conducted by comparing the state's nine Educational Service Districts (ESDs) which include; Spokane (ESD 101); Yakima (ESD 105); Vancouver (ESD 112); Olympia (ESD 113); Bremerton (ESD 114); Puget Sound (121); Walla Walla (123); and Wenatchee (ESD 171). Full data reports comparing individual districts with the overall state findings can be found at www.technology-alliance.com, or by contacting the Technology Alliance at 206-389-7348.

Results are assumed to be statistically significant within ±3 percentage points at the 95 percent confidence interval. That is, 95 times out of 100, the results will

differ by no more than three percent from what would have been obtained by surveying all 297 districts.

[1] ***Five surveys were returned incomplete, and are not part of the sample count.***

Key Findings

- Spending on technology in Washington State during the 1997-98 school year averaged approximately $133 per student
- Bonds and Levies provide the second largest source of money for technology (after district operating budgets)
- About 95 percent of districts have a formal technology plan that includes a program for training teachers and integrating technology into the curriculum
- Students have access to approximately 163,000 computers, or one computer for every five students
- About 42 percent of these computers are considered “networkable”, i.e., purchased after 1994
- Overall, there is about one “networkable” computer for about every 13 students
- Just under two-thirds (64%) of classrooms have Internet access
- Districts with higher per-pupil property assessments are likely to spend more per student than those with lower per-pupil property assessments
- Training, and time for training emerged from the survey results as the two most pressing issues related to the effective use of technology in the classroom

Funding

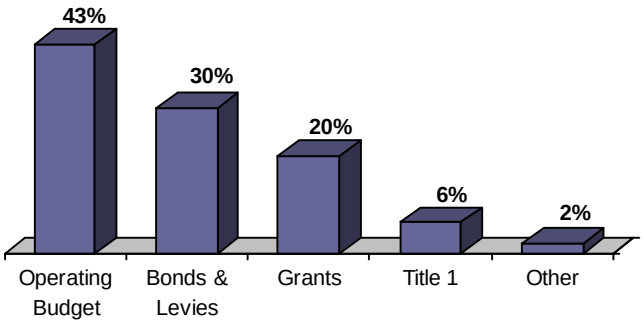
One of the target questions of the Technology Alliance survey was how much money is spent currently on technology by schools districts. Results show that 1997-98 technology expenditures in the responding districts total approximately $107 million. If

[1] Five surveys were returned incomplete, and are not part of the sample count.

pro-rated to all 296 districts, this figure would total about $132 million, or about $133 per student. Findings suggest, however, that few schools are in a “fully funded” position and spending varies dramatically—from a low of about $5 per student in Cle Elum-Roslyn, to a high of $650 per student in Brinnon.

Findings from the survey also reveal that no single source of money provides the majority of funds for technology-related expenses in schools. While the largest source of funding—about 43 percent—comes from district operating budgets, bonds and levies also play a vital role; just under one-third (30%) of all districts’ technology monies come from bonds and levies. In fact, bonds and levies passed in fiscal year 1997-98 will provide an additional $204 per student in the affected district over the life of the bond/levy.

Sources of Techology Funding



A key problem with this type of funding, however, is the fact that capital bonds and levies have major limitations as funding sources, and not all districts are or can be successful at passing them. For example, in the past five years, 26 districts, representing 14 percent of students, have failed at all attempts at passing a levy.

Nearly all of these “non-passing” districts are small (only four have student populations greater than 10,000) and most have slightly lower than average property assessment values—$324,000 compared to about $356,000 statewide. Yet, one of the most noteworthy characteristics of these districts is the fact that they spend, on average, less per student per year than those that have been successful at passing a bond or levy, $101 versus $133.

Technology Plans

What we know from practice is that costs of integrating technology as an effective learning tool are far greater than what schools can currently spend. Many components add to the cost of getting up-to-date technology and training into classrooms. Among the most obvious are hardware and software costs; connections within schools and to the Internet; the initial training and long-term support of teachers; and infrastructure improvements. The difficulty, however, is arriving at reliable estimates of what it will cost to meet such goals.

To this end, the State of Washington requires that each district submit a technology plan that outlines needs and the estimated costs of how schools will be ultimately outfitted. At the time of this reporting, 216 of the 227 responding districts have submitted such plans to OSPI.

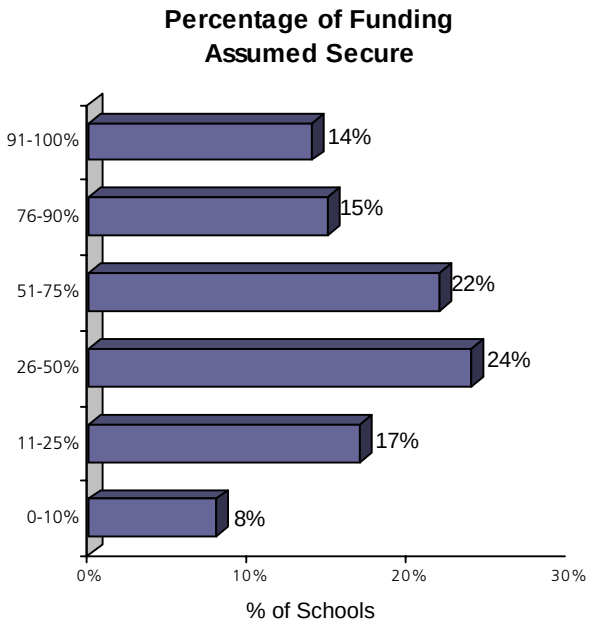
While some districts have submitted plans based on full needs, others included only those program elements with *guaranteed* funding. This implies that costs projected on a per-student basis vary widely; from a low of approximately $2 per student *per year*, to a high of $5,000 per student year over the plan's targeted time frame. Nevertheless, of the districts that have submitted a technology plan:

95% have a program aimed at training teachers in the use of technology

97% have a program to assist teachers with integrating technology into the curriculum

64% include a 5-year depreciation and replacement program for equipment

If fully implemented, combined costs of these technology plans total approximately $604 million to be spent over the next four years, or about $759 per student. However, as the graph shows, less than 14 percent of districts assume a full level of funding to implement their technology plans (see graph).



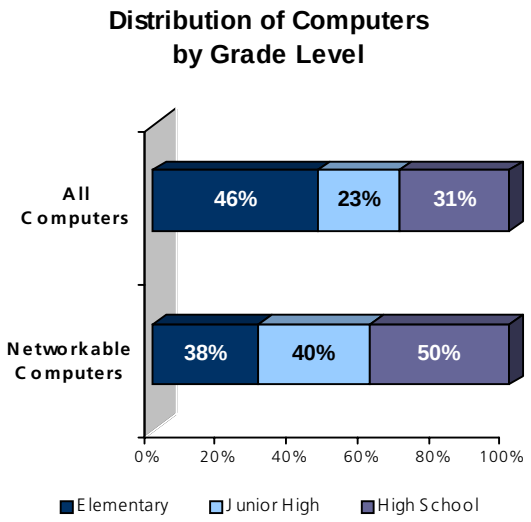
Hardware

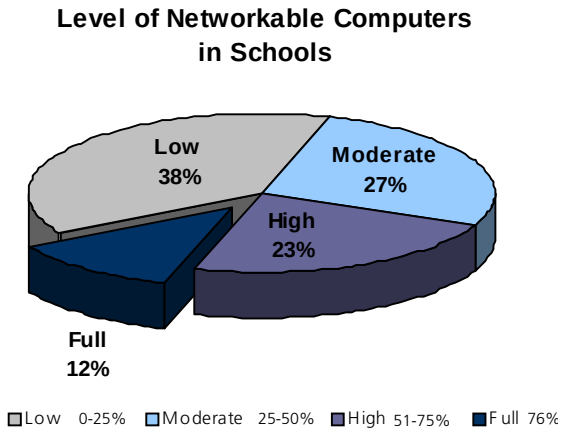
To make technology a viable instructional tool requires schools to have enough computers available to all students. Across the State of Washington, students face a ratio of one computer for every five students, or about 200,000 computers.

Integrating technology fully into students' learning experiences, also requires a high density of multimedia computers able to run the latest software or access the Internet—ideally a 1-to-5 ratio of student-to-"networkable" computer (equipment purchased after 1994).

The majority of computers in Washington schools, however, comprises of computers with fewer of these capabilities; about 42 percent have features that allow for network access. By grade level, this translates into a ratio of; one networkable computer for every 11 high school students; one networkable computer for 13 junior high school students; and one networkable computer for 14 elementary school students.

Breaking the survey results down further reveals that, although more than one-third of the districts have a relatively low level of networkable computers (38%), these districts represent approximately 28 percent of all students, whereas districts with a moderate level of networkable computers represent nearly one-third of the state's students. In addition, combined high and full districts represents about 40 percent of the state's students. Nevertheless, seven districts (representing 3 percent of the students) have no networkable computers.


Distribution of Computers
by Grade Level
All
Computers
46%
23%
31%
Networkable
Computers
38%
40%
50%
0%
20%
40%
60%
80%
100%
Elementary
Junior High
High School


Level of Networkable Computers
in Schools
Low
38%
Moderate
27%
High
23%
Full
12%
Low 0-25%
Moderate 25-50%
High 51-75%
Full 76%

Connectivity

Schools in Washington are well connected; about 64% of the classrooms in the responding districts have Internet access, and 38% of the districts report having Internet access in **all** of their classrooms.

Other types of connectivity include dedicated data lines and Internet dial-up. While the use of these tools continues to fall as they are replaced with direct Internet access, they provide smaller districts, and districts with less funds dedicated to technology with a cost effective way of integrating technology into the curriculum.

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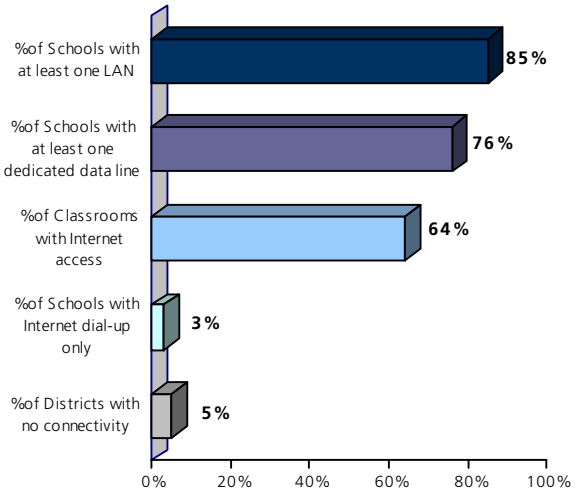
Level of Connectivity



Equity

Identifying funding sources, expenditures and technology demographics provides a framework with which to gauge how technology is distributed across the state's schools. It does not, however, show how equitable the distribution is. Studies suggest that many schools with large concentrations of low-income students are less likely to have access to computers and are less likely to have access to the Internet.

One of the goals of the Technology Alliance survey was to determine if any such inequities exist in Washington schools. To do so, a number of correlation studies were performed, measuring if any relationships emerged between poverty levels[2] [2]and spending per student, or poverty levels and connectivity in school districts within the state.

> While the graph below suggests that levels of connectivity and spending are higher in schools with "less poverty," no *statistically* significant relationship was actually observed.
>
> It is important to note the fact that participation in a reduced or school lunch program is highly correlated with per-pupil property assessments. This is to say that students from households with lower incomes (hence, higher rates of program participation) are more likely to live in areas where property values are lower. Hence, the apparent pattern depicted in the graph reveals the spurious relationship that exists between school lunch program participation and the level connectivity, without controlling for the influence of per student property assessment.
>
> Given this premise, when the level of per-pupil property assessment was correlated with *spending*, a positive relationship did emerge. In other words, one could expect that schools with a lower property assessment base will spend less per student than those districts with a higher assessment.

These findings, however, are inconclusive as to which budget items technology dollars are allocated. No assumption can be made regarding *the level* of connectivity and per student spending; higher per student expenditures do not automatically mean a higher level of Internet connection, for example. While there is something to be said about the efficiency and efficacy in the use of funding, schools invariably are at different stages of upgrading infrastructure. Likewise districts may place more emphasis on program elements that are harder to quantify than hardware and connections.

Such is the case with Seattle, where school districts dedicate a larger portion of technology funds to professional and staff development. Also, costs of implementing technology may vary substantially depending on the area of the state or even the type of building structure involved; some schools may face lower labor costs, others benefit from economies of scale etc.

The conclusion to reach from these correlations, therefore, is how tax dollars are distributed among schools, not how dollars are spent within them.

Area	ESD #	Assessed Property Per Pupil	Annual Spending Per Pupil

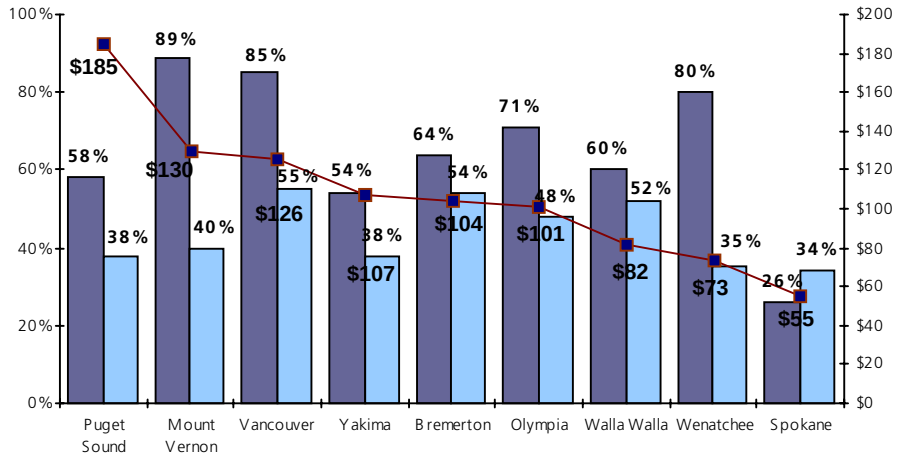
[2] ***Defined either as the percentage of students participating in a reduced or free lunch program, or the district average per-pupil property assessment***

Yakima	*105*	$194,505.29	$107
Wenatchee	*171*	$241,360.68	$73
Walla Walla	*123*	$246,676.58	$82
Spokane	*101*	$256,461.40	$55
Olympia	*113*	$267,605.04	$101
Bremerton	*114*	$331,141.13	$104
Vancouver	*112*	$335,189.38	$126
Puget Sound	*121*	$427,742.39	$185
Mount Vernon	*189*	$513,958.40	$130
STATE WIDE AVERAGE		$337,584.00	$133

% of networkable Computers in Schools

% of Classrooms with Internet access

$ spent per student per year



Pressing Issues

While funding for equipment remains the number one barrier to widespread use of technology, educators face a variety of challenges than just acquiring linkages. Upgrading teacher training is key to integrating technology into the classroom and to increasing student learning. In fact, when the Technology Alliance asked what were the most pressing issues related to the effective use of technology in the classroom, one key finding indicated that school districts *lack the time* and resources to train and provide professional development to teachers (and other educational staff).

Another issue highlighted by the survey is that teachers who do have training, and use computers in the classroom, often *lack the technical support* to maintain or repair their teaching tools. Almost one-third of districts have no official maintenance plan or staff in place. Computers become effective instructional tools only if they are readily accessible to students and teachers *and* well maintained. Despite the fact that schools most commonly have access to a d*istrict level* support person who services several schools, only 2 percent of the districts have at least a part-time technical support person in each school; most maintenance and repair, therefore is done by teachers, staff or students on their own time. As a result. only 14 percent of the state's school districts can meet a "down-time" of two days or less.

Success Stories

The **Lake Washington School District** formed a foundation to help process and distribute donated equipment among students who score in the lower 25 percentile of the state's 4th grade assessment test. The program allows for computers to be set up in the student's home, and equipped with a modem and an Internet account (at no cost to the family). By exposing and providing access to topics of interest, the program helps motivate children to read and improve writing skills.

The **Lake Washington School District** also wrote and received a grant—from GTE, Compaq and Microsoft—to form a resource center that provides free basic computer and Internet training three nights a week to the community.

In November 1997, **Pe Ell School District** participated in an international environment forum to study recycling. The program involved a video conference in which four high school students participated, along with students from Finland, New Zealand and Japan.

Snohomish School District successfully implemented a laptop program that allows students to have access to technology at anytime. The program has created a vital link between parents, schools, businesses, and the community to provide technology as a toolbox for learning opportunities in a personalized way. Currently there are more than 630 students, grades 5-7, involved in this program. The program will be expanded to the 8th and 9th grade for next year.

Over the past three years, **Freeman School District** has been able to carve out between $50,000-$75,000 from the operating budget to provide a solid technology presence in the district. These efforts won the confidence of citizens and allowed us to pass a $915,000, five-year technology bond in February 1998. Coupled with the $70,000 a year from M&D funds, there is approximately

$2,000,000 to spend on 900 kids over 5 years—this does not include e-rate discounts.

Appendix

B

Report and Recommendations

Summary of Recommendations - Results of the Educational Technology Summit, May 19, 1998

The following section contains 24 recommendations made by a group of 250 educators, government officials and business leaders who read policy papers, heard presentations and discussed educational technology issues at a full day conference on May 19, 1998. Their perspectives, outlined below, are incorporated into the task force's recommendations.

Connectivity

Recommendation #1	**K-20 Network**

To: The Governor, the Legislature, TOPC

Support continued buildout of the K-20 Network and provide ongoing funding to ensure high quality ongoing maintenance of the network.

Recommendation #2	**Connectivity Within School Districts**

To: The Governor, the Legislature, TOPC, school districts, OSPI, corporate and non-profit organizations

Connect every K-12 school building in the state of Washington to the K-20 network and the Internet with a high speed connection by 2000 and every instructional space in those buildings with a high speed connection by 2002. Establish, collect and publicize annual statistical measurements for each school district in the state showing the type and speed of connections to the Internet and number of instructional spaces in each school connected to the Internet. Follow up on the Technology Alliance survey data annually over the next four years and make the data available to the public.

Recommendation #3	Connectivity Support for Rural Areas and Needy School Districts

To: The Governor, the Legislature, TOPC, OSPI, corporate and non-profit organizations

Identify and help correct the financial, regulatory and other barriers that prevent broadband Internet connectivity at reasonable prices to every K-12 school building in the State. In particular, provide support to schools serving low income populations and those in rural areas where costs of connectivity are high.

Recommendation #4	Connectivity For Teaching Staff

To: The Legislature, school districts, OSPI

Ensure that every teacher in the state has easy access at work to electronic mail and the Internet by 2000. Encourage parent-teacher communication through e-mail and web sites.

Recommendation #5	Training and Technical Support

To: The Governor, the Legislature, TOPC, OSPI, corporate and non-profit organizations

The state, in partnership with the corporate and non-profit sector, should provide additional training and technical support to school districts needing assistance to connect efficiently to the K-20 Network and build their own local networks.

Recommendation #6	Best Practices

To: TOPC, OSPI, corporate sector, teacher education institutions, professional associations

Organize an inter-institutional group to collect and disseminate best-practices and to measure the extent and the effectiveness of the use the Internet and distance education in expanding access and providing efficient instruction.

Recommendation #7 Community Outreach

To: School Districts, OSPI, the Legislature, non-profit organizations

Establish programs for K-12 schools to share their Internet connectivity after hours with parents and others in their community. Provide incentives for districts to establish innovative after-hours technology programs and access for students, parents and community members.

Hardware, Funding & Maintenance

Recommendation #1 Flexible Use of Bonds and Levies

To: The Legislature

It is recommended that the Legislature provide school districts increased flexibility in their use of capital bonds and levies to purchase more than just hardware, so they can more effectively deploy, operate, upgrade and maintain technology and telecommunications in the K-12 education system.

Recommendation #2 Support to Needy Districts

To: The Legislature, K-12 school districts, OSPI

It is recommended that the Legislature assist economically needy K-12 school districts in securing affordable access to technology and telecommunications through funding for network planning and technical assistance within and between buildings; support for education/community/business partnerships which prototype leveraging of resources; establishment of tax incentives for the high-tech industry to assist have-not schools in securing affordable access; and funds to match some portion of local spending on technology and telecommunications.

Recommendation #3 Redefine "Basic Education" to Include Technology

To: The Legislature

It is recommended that the Legislature recalculate NERC (the state's basic education funding formula) and increase it so that there is explicit funding for technology as part of

basic school funding. To ensure maximum benefit from this funding, resources should be provided to assist school districts to develop or update, implement and assess technology plans focused on student learning. Incentives should be built into the funding to encourage districts to budget for all aspects of effective use of educational technology, including maintenance and support, upgrades, software and electronic resources, staff development, etc.

Recommendation #4	**Depreciate Technology Investments Appropriately**

To: The Legislature, school districts

It is recommended that the Legislature and school districts treat educational technology investments as a depreciable commodity, as they currently do buses and textbooks. This would include but not be limited to the ability to lease hardware and have a 3-5 year replacement cycle for computers.

Recommendation #5	**Increase Technology Support Staff**

To: The Legislature, the State Board, school districts

It is recommended that the Legislature increase the staffing formulas for schools to provide adequate educational technology staffing support to schools and classrooms. This should include the flexibility to use non-certificated staff for basic maintenance and support, and to provide competitive salaries for highly technical staff at the district or regional level. In addition, they should direct the State Board to examine funding formulas for construction to ensure that they support the effective deployment of educational technology in new or remodeled school buildings.

Recommendation #6	**Research and Disseminate Best Practices**

To: OSPI, Educational Technology Support Centers, corporate and non profit organizations

It is recommended that OSPI, the Educational Technology Support Centers, and others, based on input from a broad-based Educational Technology Advisory Group, provide schools with guidance based on current research to school districts on the use of educational technology on issues such as: age-appropriateness for initial technology usage; effective methods of staff development using technology; deployment of computers in labs or classrooms; optimal number of computers per classroom; high school or elementary buildings addressed first; emphasis on broadband networking access; implementing networks first or after initial hardware purchases; and use of laptops by all students.

Professional Development

Recommendation #1	Technology Proficiency Standards for New Teachers

To: The Governor, the Legislature, teacher education institutions, State Board of Education

The governor and state legislature should adopt a set of technology proficiency standards that all newly certified teachers must meet by 2000. These standards would address productivity skills and the ability to integrate technology into the curriculum.

Recommendation #2	Hiring "Tech Savy" Teachers

To: School districts

School districts should be required to give preference in hiring teachers new to the district who meet these standards beginning in 2000.

Recommendation #3	Tech Training Required In Teacher Education

To: Teacher education institutions

Teacher education institutions should be required to meet these standards in order receive state funding by 2002.

Recommendation #4	Current Staff to Meet Minimum Technology Standards

To: The Governor, the Legislature, school districts, teachers and principals

All teachers and principals currently employed by public schools in Washington should meet these same minimum standards by 2002. The governor and state legislature should allocate resources necessary to assist schools to meet this significant one time upgrading of skills.

Recommendation #5 Minimum Standards for Principals

To: The State Board of Education, professional associations

The state board should develop a minimum set of standards to ensure that principals can demonstrate an understanding of the principal's role as instructional leader in educational technology and an understanding of the management issues that principals face when they integrate technology into their school. All new and current principals should meet these standards by 2002.

Recommendation #6 Change State Capital Levy Law

To: The Legislature

Many districts interpret current state capital levy laws as to bar schools from using these resources to meet teacher and principal training needs. These laws should be changed so that schools may explicitly use these resources to assist in training teachers and principals in the use of technology in the classroom. In revising current law, the new law should include provisions so that proportionate amounts of levy money may be spent for hardware, professional development and technical support.

Recommendation #7 Best Practices In Instructional Technology

To: OSPI, the educational service districts, professional associations and state universities.

These groups should play an active role in developing, identifying and promulgating best practices in the use of instructional technology.

Recommendation #8 Support Districts in Professional Development

To: OSPI, professional associations and the educational service districts

OSPI, professional associations and the educational service districts should actively provide support for schools and district's developing technology plans and professional development plans to assure that less capable districts do not fall behind. OSPI should identify for the state executive and legislature areas of need.

Recommendation #9 **State Funding for Equitable Professional Development**

To: The Governor, the Legislature

The executive and legislative branches of the state government should equitably fund training to insure that the changes recommended above are implemented as meaningful legislation.

Content and Curriculum

Recommendation #1 **Resources for Teachers**

To: OSPI, the Legislature, and other partners.

Create a website (or websites) where teachers can access instructional resources linked to the Essential Learnings.

Recommendation #2 **Technology Essential Learnings**

To: The Legislature, OSPI

Consider the possibility of having technology essential learnings for which students would be held accountable.

Recommendation #3 **Content and Curriculum Partnerships**

To: OSPI, the Legislature, and other partners

Create and support initiatives through which Washington State businesses, museums, universities, governments and others form partnerships with K-12 educators to put content and curricula on line.

Appendix

C

Report and Recommendations

My Top Ten List by **Christopher Held**

1998 Best Supporting Role Awards of Education Technology In Washington State

More and more of us are coming to believe that technology has an important part to play in the learning that takes place in the classroom. Used properly, with good teaching, technology can improve student learning and achievement. However, technology can also be ineffective and counterproductive. Not everyone understands how to achieve the former and too many are mired in the latter. The purpose of "My Top Ten" list is to highlight ten of the many varied and extraordinary efforts where technology supports teaching and learning and therefore strengthens education reform here in Washington state.

I hope this list will serve as a resource for busy teachers. During my 25 years in the classroom I came to appreciate just how demanding and time consuming teaching is. I came to realize how little time there was for other activities. I hope this list will save teachers time that they can redirect to what they do best; teach our children.

Recently, I spent the past seven months studying education technology in Washington state, visiting our schools, and talking to teachers, legislators and business leaders. During my visits I was often the lucky victim of serendipity. I received unexpected gifts. Now I want to share ten of them with you.

I discovered a number of excellent projects, programs and web sites related to education technology. These ten winners are guided by individuals who understand the complexities involved in bringing technology into our classrooms and yet, despite the difficulties, are doing something about it. They are "walking their talk". They are making a contribution. These ten best practices are each contributing an important piece to a complex puzzle that, when finished, will help classrooms become high performance places where technology is improving student learning and achievement.

This list is presented for both educators and members of the business community. I hope teachers use these resources to improve their craft and I hope the business community understands the power of these models and, therefore, will search for ways to support these efforts. While I have worked with the Technology Alliance I have learned that there is much creativity and energy in the business community. Working together with educators they can supercharge the efforts to improve our schools.

While this is an eclectic list, all ten winners ultimately support classroom learning. I have included projects, programs and web sites. Some of the web sites provide tremendous

resources to eager and curious learners. Other sites are geared to supporting teachers who are delivering the curriculum to our students. Some of the projects or programs support teachers and principals as they attempt to upgrade their technology skills so they can better integrate technology tools into the curriculum. One winner was selected because of the thoughtful way it deals with equity issues. In a state with inequitable funding this effort is greatly appreciated.

There are undoubtedly many more "Best Practices" out there that I have not yet had the good fortune to visit. This list, however, will provide us with great models worthy of support and may help us to spot others in the future.

So without further ado, here is my first ever top ten list of Best Practices. Every one of these ten makes an important contribution to the overall success of education technology here in Washington state.

1 700+ GREAT WEB SITE FOR ELEMENTARY STUDENTS

If kids are what our work is all about then this site is truly a "best practice". This site is built for kids. The homepage states, "Amazing, Spectacular & Mysterious, Colorful Websites for Kids And The Adults Who Care About Them" and the webmaster is correct. I have never seen such a thoughtful and rich place for children. The Association of Library Services to Children maintains this site which is a part of the American Library Association. The links are thoughtful and varied. As you read through the links you begin to realize not only how exciting a learning environment like this can be, but also, you realize that a site like this can really help a teacher to individualize learning for the children in her room.

Comments: This site and others like it should be on every classroom computer in the state. The more that children have access to exciting, useful and appropriate information the greater are our chances of moving our students to higher levels of learning and achievement.

Web site: http://www.ala.org/parentspage/greatsites/amazing.html

#2 GENERATION WHY

Generation WHY is an incredible project out of the Olympia School District. The project uses secondary age students in ways that traditional education can't begin to imagine. These kids do real work that is making a difference for teachers, the local community, and corporate sponsors. The students begin with an 18-week semester course where they learn about technology and how to mentor. They learn about information literacy, how to do research and how to make presentations. These skills help them as they work with an individual teacher during the regular school day to integrate technology into the lesson plans or units of the teacher. This project has been so successful that it has won national awards and been featured in countless publications and at numerous conferences. Fourteen more districts from around the country are now helping to expand the effort here in the United States.

Comments: This project is special because it treats kids as special. In Generation Why kids are taken seriously. They truly collaborate with teachers. They have real say in the overall project. Their expertise with technology is merely the "foot in the door" of educational reform. They are helping us to rethink the relationship of teachers and students in a win-win environment.

Web Site: Http://osd.wednet.edu

#3 ATHENA: Earth and Space Science for K-12

Athena engages students in observing phenomena using remote-sensed data to construct knowledge about the world. Data sets and instructional pieces are related to oceans, the atmosphere, Earth resources, and space/astronomy. Real-time data is used where possible. The material is intended for direct use by students with appropriate assistance from teachers. The goal of Athena is to enhance the K-12 science curriculum, and facilitate use of the powerful computational tools in the classrooms networked to the Web. Scientists and educators work together developing instructional material for K-12 science teaching based on data acquired via Internet. The materials include data sets with appropriate explanation, student activities, and teacher background information delivered to classrooms via pages on the World Wide Web. K-12 classroom teachers and students are the target audience of this project. Athena instructional materials are available to anyone with a connection to the WWW.

Comments: This is a great example of what an educational web site ought to be. It is the product of a business/education partnership. It asks kids to do real work in science using real data and it supports teachers as they plan the lessons and units that the kids will study. The information is high quality. The information is not just posted on the web but is carefully edited for educational and scientific content, pedagogy and appropriateness. This site stands in contrast to many web sites that simply post far too much material that is of far too little quality. Athena sets a high standard that other sites should use to evaluate their own contribution to the "on-line education community."

Web Site: http://athena.wednet.edu/

#4 KENT SCHOOL DISTRICT'S "TEACHER'S TOOLBOX" WEB SITE

If technology has to potential to save us time in the future then here's what it looks like now. This web site is a teacher's dream. Talk about one stop shopping! This page has it all for busy teacher trying to support eager learners. Linked to this one page are many useful resources: from the morning lunch count, bus schedules and student information and student portfolios; to the county libraries, satellite TV, lesson plans; to staff training opportunities, Internet curriculum and the State Essential Learning Requirements.

Comments: This seems, at long last, to be an example of a promise made years ago. Early on we were told that, one day, technology would save us time. Most early efforts with education technology have increased teacher workload and time. This Teacher's Toolbox appears to be a step in the right direction. Saving teachers time in lesson

planning, reporting lunch counts and finding resources for upcoming lessons all promise to allow teachers more time to support student achievement.

Web site: http://www.kent.wednet.edu/toolbox/index.html

#5 **WASHINGTON SOFTWARE FOUNDATION**
John Wall, CEO, Wall Data; Board Chair
Keneta Anderson, Executive Director

Teachers have a challenge ahead in helping their students meet Washington State's new academic requirements, and Washington Software Foundation provides technology resources that help. Washington Software Foundation (WSF) helps teachers teach better and students learn better, using technology as a tool. A non-profit, public foundation, WSF initiates grants, awards, and collaborative projects that help close the technology gap for students, parents and teachers in communities at risk. Through these activities, the Foundation has become a catalyst for change in Washington classrooms as well as within the high-tech world that generates the core of WSF funding.

The annual WSF Innovation in Teaching Awards honor five Washington State teachers for their outstanding uses of technology to teach mathematics and science. Rather than focusing on the fastest equipment or freshest software, the awards honor teachers who have gotten a high impact on students using available technology, and who have shared new approaches with their peers. Winners receive a grant in conjunction with the award. All Washington K-12 teachers are eligible to apply as long as they are registered to vote and serve a high-need student population.

Washington Software Foundation also offers $1,000 to $20,000 project grants through a semi-annual, New Technology Partnerships grant program. New Technology Partnerships support projects using technology to help teachers and students reach their basic goals--better achievement in reading, writing, math, science and other areas. Because WSF typically serves areas of high poverty, traditional challenge grants--requiring matching funds raised in the community—are often unrealistic. Washington Software Foundation asks instead that the schools contribute a "match" by getting parents and other volunteers involved along with the teachers and students. Unsolicited proposals are accepted from schools and non-profit groups statewide.

High-technology companies, individuals, and others interested in the mission are the Community Investors who support WSF's programs. They recognize that technology helps students reach educational goals, become enthusiastic producers of knowledge, and prepare for a lifetime of change. They realize that access to technology is critical for all Washington children, and that the private sector must play a role in ensuring that access. Washington Software Foundation and its Community Investors have set a standard for involvement among the state's fastest-growing and most profitable enterprises. (Detailed information is available at their web site, or by contacting Washington Software Foundation, 3101 Northup Way, Suite 203, Bellevue, WA 98004, 425-827-9760.)

Comments: It's great to see the state software association come together to support the schools in such powerful ways. To link the work back to the state's Essential

Academic Learning Requirements (EALRs) and to make such a strong commitment to equity are but two indicators of a high quality operation.

Web Site: http://www.wsf-wa.org

#6 CEO FORUM ON EDUCATION AND TECHNOLOGY & THE "STaR CHART"

The CEO Forum on Education and Technology is a unique partnership among 21 U.S. business and education leaders who have defined their mission as "Building a common understanding of the issues and realities associated with the use of technology in education today and to assess how ready our schools are for teaching and learning in the 21st century." Through their efforts we have come to understand that the issues are not as simple as hardware and connectivity but also include professional development and digital content. They also correctly assert that the benefits of these four pillars can only be attained when they are all present and integrated into our classrooms. Their perspective on education technology as a part of overall education is clear headed and balanced. They state that "Schools must also continue providing students with basic skills such as reading, writing and computation because technology has few benefits without basic skills." Perhaps their greatest contribution is in the area of assessment. Through their STaR Chart (School Technology and Readiness Chart) they have given us an objective way to begin to measure progress in each of the pillars. The CEO Forum maintains an informative web site that includes the entire STaR Chart.

Comments: Education technology is a big topic. Breaking it into the four pillars of connectivity, hardware, professional development and digital content help to clarify the subject.

Web sites: http://www.ceoforum.org/report97/index.html
http://www.ceoforum.org/report97/starchart.html

#7 TEACH THE TEACHERS - SUMMER TECHNOLOGY INSTITUTE

The "Teach the Teachers" program is designed to meet the needs of K-12 educators who want to use technology in the classroom, but struggle to find the time needed to learn about ways of using technology and integrating it into their instruction. This summer program will provide educators an opportunity to spend an entire week focusing on how to use technology to improve teaching and learning. Thanks to a generous grant from QFC and partnership between Seattle Public Schools, Alliance for Education, University of Washington, The Thacher School, Microsoft, Compaq and KOMO, move than 150 teachers from selected school districts in Western Washington will receive this gift of education and time at no cost to them.

Comments: If you really want folks to learn something you need to pay attention to some important details. You need small classes so learners can get the help they need; these classes have a maximum enrollment of 12. You need enough time spent on the learning that learning really happens; these workshops are intensive - a full week, all day every day; nobody goes home at night. You need relevance, buy-in and connections to the real world; these teachers are learning applications they have chosen, they are planning units they need to teach next year and they are giving up their vacation time

because they are motivated to learn. This program has an extensive partnership list which demonstrates a wonderful collaboration within our community and suggests important directions in the future.

#8 THE LEARNING SPACE

An online community of educators in Washington State dedicated to the improvement of student learning through the effective use of telecommunications in the classroom. The vision of The Learning Space is to create an on-line learning community that improves education in Washington State. The global connections for learning which the Learning Space develops are integral to the restructuring efforts currently underway in Washington State. The first step of the project was to train a cadre of teachers and administrators in the use of telecommunication technologies. In addition, it has helped to provide educators with a telecommunications infrastructure, thereby improving collaboration and communication for the support of instruction and the increase of student achievement.

Among the many resources the Learning Space has to offer are:

- teacher networking;
- curriculum development;
- lessons and activities;
- student projects;
- technology standards; and
- technical assistance.

In short, the Learning Space is a collaboration with one basic goal: to improve student learning by empowering educators across the state to use technology effectively in K-12 learning experiences. There is no 'owner' of the Learning Space. It belongs to everyone interested in the promotion of telecommunications in education. Visitors to the Learning Space are invited to browse for useful resources. In addition, most pages have e-mail addresses to allow visitors to communicate directly with others who share the same interests. I hope you will visit soon and that you will find in the Learning Space such a wealth of educational resources that you will want to come back again and again.

Comments: This grassroots effort has teachers teaching and supporting other teachers throughout the entire state. Thanks to a generous donation from US West coupled with the organizational efforts of the WEA and the 9 's, approximately 570 teachers received laptops to help them with their work. These 570 teacher leaders are in geographically diverse locations and are now in a position to serve as leaders in the training of other teachers who want to use technology as a tool to support student learning.

Web Site: http://www.learningspace.org

#9 TEACHING, LEARNING, AND TECHNOLOGY PROGRAM

The Teaching, Learning and Technology Program is designed to help educators incorporate technology into their curricula and prepare students to become active,

knowledgeable user of technology. The program offers three levels of learning that participants can complete:

- Courses for individual professional development
- A 12-credit 'Certificate of Accomplishment'; and
- A 24-credit program which fulfills the requirements for the Washington State Endorsement in Instructional Technology

This program is targeted to school and school district leaders committed to providing a professional development program to a wide range of educators. The Teaching, Learning and Technology Program is structured as a compilation of Web-based learning modules, supplemented by on-line instruction and discussion, in-person meetings, traditional texts, videotapes, and video teleconferencing. The program was developed collaboratively by K-12 educators, University of Washington faculty and staff, and technology professionals. These modules are shorter units of content that focus on specific learning outcomes, can be combined constructively, and accommodate an educator's busy schedule. The following is a sample of topics with their modules:

Examining Issues of Teaching with Technology

1. An Introduction to Issues of Teaching with Technology (1 credit)
2. Seminar in Issues to Teaching with Technology (2 credits)

The Assessment Process and Technology

1. Connecting Technology to the Assessment Process (1 credit)
2. Using Electronic Portfolios to Assess Learning (3 credits)
3. Ethics and Legal Issues in Educational Technology (3 credits)

Troubleshooting Technology

1. Basics of Technology Troubleshooting (2 credits)
2. Developing Technology Support Strategies (2 credits)

Comments: Three features of this program stand out. First, it is built on a principle of whole school involvement; second, by creating small modules, it allows schools and districts to have a highly individualized training program; and third, it honors the wisdom of the proverb that says it is better to teach a man to fish than it is to give a man a fish. Like the Learning Space model, the emphasis on training trainers allows those who join to "buy in" and it allows far more individuals to receive training.

Web site: http://www.washington.edu/uwired/outreach/tlt

#10 THE COMMISSION ON STUDENT LEARNING (CSL) & THE ESSENTIAL ACADEMIC LEARNING REQUIREMENTS (EARLs)

My top ten list would be irrelevant if it did not end with a focus on what all the technological connectivity, hardware, training and content is for. As you may have guessed by now the answer is student learning. Some of you, especially non-educators, may be asking, "Just what are the things our children are supposed to learn?" I hope this final selection will help to answer that question. The Commission on Student Learning Web site helps to explain the entire education reform movement here in

Washington State. When you visit the web site you will also see a link to the Essential Academic Learning Requirements (EALRs).

Comments: As we move forward with the whole education technology movement we need to constantly remind ourselves why we are doing it. This site is where we come to do that.

Web sites: http://csl.wednet.edu/
http://csl.wednet.edu/Web page/2 Academic standards/EARL's link

Appendix

D

Report and Recommendations

Funding Technology: Traditions and Innovations

Cynthia M. Weed & Grace T. Yuan, Preston Gates & Ellis LLP

I. State Funding of Basic Education

Washington State's Enabling Act required the state constitution to provide for a system of public schools.[3] Accordingly, Article IX of the Constitution established education as Washington State's only paramount duty:

> It is the paramount duty of the state to make ample provision for the education of all children . . .

The Washington State Supreme Court eventually interpreted "paramount duty" as imposing an affirmative duty on the state to fund education. The Supreme Court required the Legislature to provide sufficient funds from stable tax sources to fund "basic education." The Supreme Court defined basic education as including "all instruction and discipline intended to enlighten the understanding, correct the temper, and form the manners and habits of youth, and fit them for usefulness in the future." Basic education was "to equip our children for their role as citizens and as potential competitors in today's market as well as in the marketplace of ideas." *See Seattle School District No. 1 v. State*, 90 Wn.2d 476, 517, 585 P.2d 71 (1978).

In 1979, the Washington State Legislature then passed the Basic Education Act, which mandated specific course offerings. *See* RCW 28A.150.200-.500; *see especially* RCW 28A.150.220 (specifying course offerings such as reading, language arts, languages other than English, arithmetic mathematics, social studies, science, music, art, health, and physical education, traffic safety). The Supreme Court subsequently expanded the definition of basic education to include transportation, handicapped, bilingual, and remediation programs. *See Seattle School District No. 1 v. State*, 97 Wn.2d 534, 647 P.2d 25 (1982).

Technology, however, has never been included in the definition of basic education by either the Supreme Court or the Legislature. Consequently, school districts have been forced to turn to local funding sources to finance computer hardware, software, and training.

[3] In 1889, Congress passed an act enabling Washington Territory to become a state. This act is commonly known as the Enabling Act.

II. Local Funding of Technology

Local funding sources for hardware, software, and training include both traditional sources such as one-year levies, two- to four-year maintenance and operation levies, and bonds, as well as innovative sources such as two- to six-year capital levies. Each funding source, however, has its limitations. For example, most funding sources -- all types of levies and bonds -- require sixty percent voter approval.

A. Traditional Funding Sources

Traditional funding sources include one-year levies, two- to four-year maintenance and operation levies, and bonds.

1. One-Year Levies

State law authorizes school districts, without restriction as to purpose, to levy special taxes for one year upon the approval of sixty percent of the voters. *See* Wash. Const. Art. VII, Sec. 2. One-year levies are all-purpose levies for any school district purpose. One-year levy proceeds may be used to finance all technology-related costs including hardware, software, and training. One-year levy proceedings must be carefully drafted, however, so as to preclude any argument that levy proceeds are to be used for maintenance and operation.[4]

2. Two- to Four-Year Maintenance and Operation Levies

State law authorizes school districts to levy special taxes for up to four years upon the approval of sixty percent of the voters. Such levies are to pay a part of the general expenses of maintenance and operation support of school districts. Maintenance and operation levy proceeds may be used to pay for training, to finance the purchase of instructional materials including software and other computer-related materials, and to replace equipment including hardware.

3. Bonds

State law authorizes school districts to issue bonds for capital purposes. *See* Wash. Const. Art. VII, Sec. 2; RCW 28A.530.010. Bond proceeds may be used to acquire sites, construct buildings, purchase furniture and equipment, and make structural changes and additions. RCW 28A.530.010. Computers are considered to be a type of equipment, and thus, acquisition of computers is permissible. Such bond proceeds may not be used to replace equipment. *See* Wash. Const. Art. VII, Sec. 2.

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[4] RCW 84.52.053 provides that once additional taxes have been authorized for maintenance and operation support of a school district for a two-year period, no further tax levies for maintenance and operation support of the district may be authorized. Thus, if either a one-year levy or a two- to six-year capital levy were to include maintenance and operation elements, it might prejudice the ability of the district to authorize another levy for maintenance and operation purposes.

Bond proceeds may be used to finance the initial purchase of equipment to be used in a new building. In addition, bond proceeds may be used to purchase library, text and reference books for a new building. Expenditures for these three types of instructional materials in an electronic format (e.g., CD ROM) are also allowed. Items of a consumable nature (e.g., workbooks) are not allowable expenditures because they are not capital in nature.

Bond proceeds may also be used to finance the purchase of new types of equipment to be used in an existing school. As noted above, however, the purchase of replacement equipment to be used in an existing school is not permissible.

B. Innovative Funding Sources

The most innovative funding source for technology is the two- to six-year capital levy. In 1986, voters approved a constitutional amendment which permitted school districts to levy special taxes for up to six years upon the approval of sixty percent of the voters. Such levy proceeds may be used "to support the construction, modernization, or remodeling of school facilities, or both . . ." *See* Wash. Const. Art. 7, Sec. 2; RCW 84.52.053.

In 1988, the Washington State Attorney General then issued an opinion which concluded that proceeds of such a levy could only be used to acquire equipment in connection with a construction project or other major structural change. The Lake Washington School District, subsequently challenged this reading of the constitutional amendment and the related statute. *See Lake Washington School District No. 414 v. Office of the State Auditor*, No. 89-2-08750-2 (King Co. Sup. Ct.).

The court ruled in Lake Washington's favor, and concluded that such a levy could be used to acquire and install computer equipment that is part of a computer system, even if the equipment is not purchased in connection with building remodeling or construction.[5] The court explained that the term "facilities" has a meaning that is "broader than 'buildings and structures,' and that facilities include personal property installed as a part of a system, such as a kitchen facility or laboratory facility." The term facility, however, does not include personal property that is not a fixture or a part of a system. Thus, a classroom equipped with computers for teaching could be a computer facility. A computer or even several computers, however, would not be a facility. The court also explained that the term "modernization" would not require structural changes. Thus, modernization could include upgrading an interconnected network or another computer facility.

Consequently, such levies may be used to finance the acquisition of computers apart from a construction project, so long as the computer acquisition is part of a system upgrade (as opposed to an isolated replacement or acquisition). Library, text and reference books in a digital format (e.g., CD-ROM) and part of

[5] While the decision of the King County Superior Court is not binding on any other Superior Court outside of King County or any appellate court, it may be viewed as persuasive authority. Moreover, representatives of both the Office of the State Auditor and the Office of the Attorney General have advised the Lake Washington School District and Preston Gates & Ellis LLP that their respective offices would recognize the court's decision on a statewide basis and would not challenge school district expenditures which conformed to this decision.

construction project may also be acquired. Such levies may also be used to finance the modernization of a computer system or facility.

School districts that wish to use levy proceeds for such purposes should develop a district-wide computer system capital plan that includes new and existing computer facilities and provides for modernization of existing facilities on a system-wide basis. The plan should consider hardware, software, and training needs. School district must also ensure that capital levy proceedings are carefully drafted so as to preclude any argument that levy proceeds are to be used for maintenance and operation.[6]

III. Summary

Local funding sources for hardware, software, and training include one-year levies, maintenance and operation levies, capital levies, and bonds. Capital levies are an increasingly important funding source. However, in order to use capital levy proceeds to finance the acquisition and modernization of computer equipment, school districts should develop district-wide computer system capital plans and voters must approve ballot propositions which specifically authorize such uses of such proceeds. Both the plans and the related election proceedings must be carefully drafted to comply with applicable constitutional and statutory requirements.

[6] *See infra* note 2.