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Teaching and Learning for Tomorrow:
A Learning Technology Plan for Maine's Future

Final Report

of the

Task Force on the
Maine Learning Technology Endowment

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Executive Summary

Technology for Maine: Transforming Education and the Economy

We live in a world that is increasingly complex and where change is increasingly rampant. Driving much of this complexity and change are new concepts and a new economy based on powerful, ubiquitous computer technology linked to the Internet.

Twenty years ago, personal computers were a relative novelty. Today, two-thirds of Maine workers use computers in their workplace. Ten years ago, the Internet as we know it did not exist; today, it drives communication, information, entertainment, and the fortunes of stock market portfolios. From the complex to the mundane, in a thousand small and sometimes unnoticed ways, computer technology has permeated our economy and changed our daily lives. Some uses of electronic technology are so ubiquitous they are unnoticed – nearly all of us use ATM machines for routine banking transactions, for example. Many newsletters and bulletins are already beginning to transition to electronic-only distribution. Increasingly, examinations for graduate schools and for various professional licensing requirements are on-line – some exclusively on-line. The technological transformation is not limited to "high-tech" businesses; main-line manufacturing, farming, service and retail industries are increasingly harnessing computer technology to improve processes, boost productivity, and innovate new approaches to stay competitive.

Our schools are challenged to prepare young people to navigate and prosper in this world, with technology as an ally rather than an obstacle. The challenge is familiar, but the imperative is new: we must prepare young people to thrive in a world that doesn't exist yet, to grapple with problems and construct new knowledge which is barely visible to us today. It is no longer adequate to prepare some of our young people to high levels of learning and technological literacy; we must prepare *all* for the demands of a world in which workers and citizens will be required to use and create knowledge, and embrace technology as a powerful tool to do so.

If technology is a challenge for our educational system, it is also part of the solution. To move all students to high levels of learning and technological literacy, *all* students will need access to technology when and where it can be most effectively incorporated into learning. With the guidance of good teachers with technological facility, computer technology and the Internet can provide students with a pipeline to explore real world concepts, interact with real world experts, and analyze and solve real world problems. Computers and the Internet offer the potential to keep classroom resources and materials current with the contemporary world to an extent that is unprecedented. Computer technology also offers opportunities for self-directed, personalized learning projects that can tailor the curriculum to student interests and engagement, and allow teachers to facilitate active student learning rather than merely the rote transfer of information.

We know that computer technology in schools – *learning technology* – done the right way can provide these tremendous boosts to teaching and learning. Hundreds of individual schools nationally and internationally have piloted "anytime, anywhere" learning technology, putting portable computers in the hands of students. Results are universally positive. Mistakes have been made, and those we can learn from. Others have tinkered, but Maine can be first: *first* to recognize, as a State, the enormous potential of learning technology; and *first* to act boldly to prepare our schools and students to meet this challenging change.

The world is changing whether we will it or not; technology is here whether we embrace it or not. Maine has a powerful opportunity to act, and to harness technology as a extraordinary tool to our benefit. Information technology can help Maine construct an economy that overcomes the obstacle of distance and the constraints of climate. Embracing technology – and making Maine's schools and students the best in America at using it – can establish Maine as a leader and an innovator. If Maine can move to where the opportunities are going to be, our goals will follow. If Maine has the most technologically capable workforce and the most technology-savvy schools in the country, we are confident the economic benefits will follow.

Task Force on the Maine Learning Technology Endowment

The Task Force on the Maine Learning Technology Endowment ("Task Force") was established in the Second Regular Session of the 119th Legislature by Public Law 1999, Chapter 731, Part FFF, Sec. FFF-2. The 17-member Task Force included six Legislators, three state agency officials representing the Department of Administrative and Financial Services, the Department of Education and the Public Utilities Commission and 8 public members, including individuals with expertise in education, business, finance and technology.

The Task Force was established to consider and make recommendations to the Legislature on issues pertaining to the structure, oversight and operation of the Maine Learning Technology Endowment ("MLTE" or "Endowment") and the implementation of a learning technology plan. The Task Force was charged to create a learning technology plan to prepare students for a future economy that will rely heavily on technology and innovation. Based on a review of the current condition of technology in the classrooms of the State, the Task Force was directed to plan to "transform Maine into the premier state for utilizing learning technology in kindergarten to grade 12 education."

The Task Force was further charged with the following duties:

A. Recommend the ongoing structure, governance and oversight of the MLTE fund;

B. Assess the current use of technology in Maine classrooms;

C. Assess the current readiness of faculty to teach using technology;

D. Determine the professional development needed to integrate technology into classroom teaching;

E. Recommend a strategy and goals for improving and equalizing access to and the use of learning technology in all schools;

F. Recommend a phased plan for implementing the MLTE program;

G. Recommend strategies that coordinate the resources and goals of the MLTE with Maine State Library Network and Maine Telecommunications Education Access Fund (State E-rate);

H. Coordinate strategies for K-12 learning technology with initiatives and resources of Maine higher education institutions; and

I. Recommend a plan to track and assess progress in implementing the goals of the MLTE program.

The learning technology plan supported by the MLTE fund must be designed to take effect no later than the start of the 2002-03 school year.

Task Force Process

The Task Force was convened on September 7, 2000, and held 8 other meetings. Task Force members received information on the formation of existing learning technology advances and related telecommunications initiatives in the State from state and local public officials and program directors. The Task Force also heard evidence of existing best practices that integrate learning technology into K-12 classrooms from Maine teachers, administrators and educational technology consultants; and was presented with a sampling of promising approaches from scholars, practitioners and innovators in the fields of teacher preparation and professional development, business and economic development, and information technology.

Guiding Principles

During the second meeting, the Task Force reviewed its charge, discussed the scope of relevant policy issues that warranted further consideration, and developed the following set of guiding principles which unify its findings and recommendations for the MLTE plan. The Task Force believes that a plan that reflects these principles will honor both the broad purposes and the specific charges assigned to it by the 119th Legislature:

Equity -- Promoting equal opportunity and providing meaningful access to learning technology resources for all learners, including those who are economically disadvantaged or have special needs.

The Task Force concluded that true equity of educational opportunity with regard to technology is achieved by personal, one-to-one, classroom- and home-based access to appropriate computer technology for teachers and students.

Integration with Maine's Learning Results -- Supporting student achievement of Maine's Learning Results through the integration of learning technologies that are content-focused and can add value to existing instructional methods.

The Task Force concluded that true integration with Maine's Learning Results requires a program not focused on learning about computers, but a focus on using computer technology as a tool to learn problem-solving, critical-thinking, teamwork and communication skills across all content areas, and encouraging teachers to adopt this kind of approach.

Sustainability/Avoiding Obsolescence -- Providing future sustainability of learning technology resources to adapt to future educational needs and to avoid obsolescence of learning technology resources.

The Task Force concluded that sustainability requires fiscal management that preserves the Endowment's principal to support learning technology over the long-term, and also requires that the State plan be comprehensive in addressing the needed components of technology infrastructure and their total costs including replacement.

Teacher Preparation and Professional Development -- Providing effective preparation, professional development, and training programs for teachers and other educators in the use and integration of learning technology tools in curriculum development, instructional methods, and student assessment systems.

The Task Force concluded that adequate teacher preparation and professional development requires that teachers, as well as students be equipped with appropriate learning technology, and that delivery of professional development in technology needs to be reorganized to emphasize "just-in-time," classroom-based approaches that focus on teacher-to-teacher assistance, exploration, and practice in integrating technology.

Economic Development -- Fostering economic development across all regions of the State and the preparation of students for a technology-rich economy.

The Task Force concluded that workplace use of technology is becoming ubiquitous and universal, and that the future prosperity of Maine and its citizens is increasingly dependent on the creation and attraction of jobs that require high levels of problem-solving, communication, and technological skills that can be achieved, in part, through a K-12 learning technology initiative.

Other Primary Policy Considerations

Task Force members also agreed that the duties charged to them by the 119th Legislature represent a set of policy elements that are critical to whether the learning technology plan can realize the promise of transforming Maine into the premier state for utilizing learning technology. The Task Force concluded that these principles must also apply to its findings and recommendations for the MLTE plan if the State is to achieve the complementary goals of preparing Maine people to be among the best educated in the world and endowing Maine students with the knowledge and skills that will prepare them for a future economy that will rely heavily on technology and innovation. Task Force members, therefore, included the following additional policy considerations as part of their mandate to recommend the MLTE plan:

Vision -- Developing a bold vision regarding the integration of learning technology in the education of our children;

Lifelong Learning -- Supporting lifelong learning for Maine citizens;

Cost-Sharing -- Fostering the equitable sharing of costs among federal, state, and local taxpayers and families, the private sector, and philanthropists;

Local Participation and Flexibility -- Enabling local school units and communities to determine how the MLTE plan will complement local efforts, and providing the opportunity to use MLTE resources to meet and exceed the standards of the MLTE; and

MLTE Governance and Administrative Structure -- Providing a governance and administrative structure that supports the effective investment, management, and implementation of endowment funds and the learning technology resources in accordance with the MLTE plan.

Task Force Recommendations: The State Learning Technology Plan

The following recommendations were approved by a unanimous vote of Task Force members. The Task Force directed its staff to draft "proposed" legislation based on these recommendations; and presents this draft to the Legislature's Joint Standing Committee on Education and Cultural Affairs for its consideration.

To maximize the probability of success, the plan is comprehensive in anticipating the array of components, costs, and supports that accompany the introduction of extensive computer technology. By ensuring that teacher professional development, internal and external networks, technical support, research content, home access, and computer devices and software are all adequately addressed, the Task Force has created a MLTE plan that goes well beyond a simple proposal to purchase machines.

1. Structure and Governance

The Task Force recommends that the proceeds of the Endowment be deployed as provided in an annual MLTE plan administered by the Commissioner of Education. The Commissioner should develop the MLTE plan in collaboration with and pursuant to policy priorities established by a twelve (12) member Learning Technology Advisory Board appointed jointly by the Governor, President of the Senate, and Speaker of the House. The goal of the MLTE plan is to transform Maine into the premier state for utilizing learning technology in kindergarten to grade 12 education in order to prepare students for a future economy that will rely heavily on technology and innovation. In formulating the plan, the Advisory Board should reexamine on an ongoing basis the same policy considerations charged to this Task Force. The Commissioner should present the recommended plan annually to the State Board, then to the Governor, and subsequently to the Legislature. The recommended plan and the proposed annual allocations from the Endowment necessary to implement the plan, should be considered in conjunction with the biennial or supplemental budget, as applicable.

2. Finances and Investment

Under the proposed plan, the Commissioner of Administrative and Financial Services ("DAFS") would act as the fiduciary and fiscal agent for the Endowment. Because technology is a long-term investment for Maine, and the sustainability of the program is ultimately critical to both equity and effectiveness, endowment funds should be invested in such manner as to preserve perpetually the principal amount appropriated to the Endowment by the State of Maine (currently $50 million), while maximizing returns. The Commissioner will report to the Legislature annually on the status and outlook of the Endowment. The Commissioner of DAFS may enter into an investment contract for the Endowment with an appropriate entity, including if appropriate, the Maine State Retirement System. The Commissioner of DAFS should collaborate with the Commissioner of Education in order to anticipate the funding needs associated with the annual MLTE plan. The Commissioners and the Advisory Board should also develop a detailed fundraising plan, with appropriate guidelines, that will be sufficient to support the expansion of the program to the high school grades.

3. Program

Goal. The goal of the MLTE is to ensure a necessary level of access to technology, the Internet, and training and learning opportunities for all Maine public schools, students and teachers at the middle school and high school levels.

Scope. Due to the considerable uncertainties in projecting the available revenues, technology needs, and associated costs for more than a few years at a time, the Task Force has articulated the long-range goal for the Endowment, and then defined with greater specificity an initial middle school phase of the plan that is financially sound, technologically feasible, and educationally appropriate based on what is known today. It

is hoped that the initial phase will successfully demonstrate the power and potential of learning technology, and guide the planning and deployment of subsequent components.

Local participation. Under the proposed plan, all school units may participate in the state learning technology plan by submitting a letter of intent indicating their willingness to participate. All students educated at public expense should be eligible to participate in the program.

Phase-In. The plan will begin in school year 2002-03 with a phase-in approach that begins with a Middle School foundation and then encompasses a High School expansion. The initial phase of the recommended program over the first two years would target all schools, students and teachers at the 7th and 8th grade levels. Phase I encompasses approximately 242 schools with grades 7 and/or 8, 32,500 students, and 2330 teachers. As soon as practicable, based on third-party fundraising, or improved revenue and cost projections, the program should expand to all schools, students, and teachers in grades 9 through 12. The Commissioners and the Advisory Board should annually assess the feasibility and recommended strategy for the expansion of the program to the high school level.

Coordination, utilization and expansion of existing technology infrastructure. The plan requires the utilization of several existing resources – principally the Maine School and Library Network (MSLN/MTEAF) and the Federal E-rate program -- that can be deployed to enable and complement the technology components that are supported by the MLTE. Appropriate policymaking entities should collaborate to ensure that the overall learning technology infrastructure of the state functions and expands in a coordinated fashion.

A. Portable, wireless, computer devices with functional software for every student and teacher at grade level

The primary component funded from the MLTE is the purchase of computer devices and a basic software package for every student and teacher in the designated grade levels. The computer defined by the Task Force – referred to as the "Maine device" will be able to run necessary software, including appropriate educational programs, while operated as a stand-alone, non-networked device, but will gain more sophisticated capabilities and storage capacity when connected to the statewide network. The Maine device will be wireless and portable and will maximize educational utility, while minimizing technical support costs. The device will be required to be rugged, tamper-resistant, and energy-efficient, yet will retain the ability to access relatively complex educational software. Although the Maine devices will have portability to allow home access, local school units will own the devices and will determine the policies governing home use of the devices by teachers and students. Filtering software will be made available by the State, but local school units will establish their own policies to activate this filtering to block access to inappropriate web content. The basic package of software applications provided will include at a minimum, but is not limited to, word processing, spreadsheets, databases, Internet browsing, and E-mail. This software would be housed, supported, and upgraded at a central server location for maximum efficiency.

Estimated costs: Approximately $15 million in initial purchase price over a 2-year period for grades 7 and 8. The cost of the computer devices would likely be spread over a longer period of several years with an appropriate financing option.

B. Basic research content and databases

The Endowment would ensure access to basic research and primary content materials, selected by the Commissioner of Education in collaboration with the Maine State Library and made available online to every K-12 school and every library in Maine.

Estimated costs: $175,000 per year.

C. Alternative Equivalent Value (AEV) option available to local school administrative units if they meet the standards and parameters of the MLTE program

A local school unit may receive funding for an alternative program rather than the State-negotiated contract, so long as the local program meets the policy parameters for one-to-one student and teacher access to computer devices, with appropriate features and functions as described in the MLTE plan. Based on guidelines developed by the Advisory Board, the school unit makes application to the Commissioner of Education for approval of the alternative program and the award of funding from the MLTE for the alternative equivalent value (AEV) in lieu of State-supplied computer devices and software.

Estimated costs: Included within estimated hardware and software costs above.

D. Teacher technology and professional development

Endowment funds will be used to equip every teacher with the same learning technology as their students so that teachers will be assured access in order to obtain optimum use in teaching. Endowment funds will also be used to provide intensive professional development for teachers to support integrating the technology into teaching and learning, with a "just-in-time," classroom-based approach. The funds will include regional support in the field provided by distinguished Maine educators with expertise in technology. Teacher support and development will also be a high priority for additional grant-writing and fundraising efforts.

Estimated costs: $900,000 over the first two years for computer devices and software, included in total hardware and software costs above. $375,000 per year initially for teacher professional development, declining in subsequent years as schools develop in-house expertise.

E. External and internal networks and technical support

External network. To reduce local technical support and ensure equitable access, the State will develop and maintain a statewide, external network funded and operated by the MSLN from existing resources. The network will provide the portable Maine devices with access to more robust applications, and enable remote technical support and software upgrades. The network will also support filtering or protective software, which may be activated for students at each school, based on local policy determinations. As part of this network, all students will be guaranteed adequate educational access to the MSLN and the Internet for home use via a toll-free, home access option. To the extent feasible, the network will also be designed to be accessible to homes with an existing commercial Internet connection (ISP) and will be designed not to compete with commercial ISPs.

Internal school networks. The Task Force recommends that the Public Utilities Commission take appropriate action to make funds available from the MSLN for the purchase and professional installation of wireless hubs by schools sufficient to cover all classrooms used by the 7th and 8th grades. Wireless networks remove the need for expensive remodeling and rewiring, and allow students greater freedom to move about the school and collaborate where needed. The MSLN should also provide for any necessary upgrades to schools' data connections.

Technical support. The Task Force plan provides extensive technical support in order to limit, to the extent possible, any need for local technical support, allowing schools to focus on support for teaching and integration of technology rather than on fixing computers. The plan will provide a warranty on the computer devices with an on-hand overstock to provide immediate replacement or repair. With a network-based approach, software support can be provided remotely and will be available by dialing a toll-free number. Software will be automatically upgraded for all individual computer users from the central server, removing the need for local schools to undertake time-consuming installation. Network support will be provided through the Maine School and Library Network (MSLN) and will be available both in person via the regional "circuit rider" program and from a help desk over a toll-free telephone line.

Estimated costs: No cost to the Endowment. Applies funding from existing revenue sources, primarily federal E-rate and the MSLN/MTEAF, to provide about $3 million per year for initial deployment (including network server and wireless hub purchase), and about $1.7 million per year in ongoing support.

F. Costs of replacement cycle for devices, servers, and other equipment

The plan covers both initial costs and the expected replacement cycle for devices, servers, and other equipment. Based on currently available information, the Task Force has conservatively estimated the life-span of the Maine devices purchased by the MLTE

to be 5 years. It is likely that it will prove feasible to extend this life-span, lowering replacement costs, and aiding the expansion of the program to the high school grades.

G. Evaluation component

The Commissioner of Education, in collaboration with the Advisory Board, should develop criteria for the evaluation of program effectiveness. The Advisory Board should annually report to the Legislature on these evaluation components.

4. Investment and Cash Flow Scenarios

In order to assess the affordability of the total costs of implementing the recommended MLTE plan – including a replacement cycle based on the life-span for technology -- the Task Force analyzed projected costs and investment returns over a 10-year period, beginning with program implementation in 2002. The Task Force examined the variables affecting investment strategy, including investment time horizons, rates of return, market volatility, the amount of the balance to be invested, and the amount and timing of payouts needed from the fund, and then analyzed several specific scenarios for financing our recommended learning technology plan. Each scenario had varying assumptions about the timing and amount of payouts.

Depending on the scenario that is chosen, annual earnings vary from year to year and range from $3 million to $4.1 million. Total earnings are projected to be $35 – 40 million over 10 years. Total costs for Phase I (Grades 7-8) are projected to be $35 million over 10 years. After paying for the costs of the learning technology plan, the estimated ending Endowment balance in these scenarios after 10 years is approximately $50 - 56 million.

Costs for Phase II (Grades 9-12) cannot be calculated with precision at this time. The additional cost of each high school grade is estimated to be $15-16 million over 10 years. Although the addition of 9^{th}-12^{th} grades cannot be assured within the existing $50 million based on current assumptions about costs and life-span, the Task Force heard testimony that cost estimates are likely to fall, technology life-span is likely longer than estimated, and that there is a high probability of securing substantial additional funds from third-party sources. A change in any one of these variables would significantly improve the financial outlook for Phase II expansion. Additional fundraising and grants from third-party sources would be targeted to support the Phase II expansion to the high school grades.

The Next Step: Legislative Consideration of the Plan

The legislation creating the Task Force authorized the Joint Standing Committee on Education and Cultural Affairs of the 120th Legislature to report out any legislation necessary to implement the recommendations of the Task Force.

I. INTRODUCTION

The Task Force on the Maine Learning Technology Endowment was established during the Second Regular Session of the 119th Legislature by Public Law 1999, Chapter 731, Part FFF, Sec. FFF-2. A copy of the law is attached as **Appendix A**. The 17-member Task Force included six Legislators, three state agency officials representing the Department of Administrative and Financial Services, the Department of Education and the Public Utilities Commission and 8 public members, including individuals with expertise in education, business, finance and technology. The Task Force membership is listed in **Appendix B**.

Creation of the Maine Learning Technology Endowment

The genesis of the Maine Learning Technology Endowment ("MLTE" or "Endowment") was Governor King's proposal to establish a $65 million endowment fund that would provide every 7th grader in the State with an Internet-ready, portable computer. The "Lunchboxes to Laptops" proposal was one of the most hotly-debated issues during the 2nd Session of the 119th Legislature. The underlying principle of the initiative was to enable the full integration of appropriate learning technology tools for students and teachers across the State. The appeal of the proposal was the creation of an endowment fund with a one-time appropriation of $50 million in unanticipated General Fund revenues. The Governor projected that such an ambitious public policy initiative would attract at least $15 million in private contributions.

While the 119th Legislature did not fully-embrace the proposal, legislators approved the creation of the MLTE fund and supported the Endowment with appropriations that ultimately totaled $50 million. In line with the Governor's vision, the Endowment can also accept funds from Federal government or private sources. The enacted law established a legislative task force to develop and recommend a learning technology plan for the MLTE fund to the 120th Legislature; and provided the Joint Standing Committee on Education and Cultural Affairs ("Education Committee") with the authority to report out legislation to implement the MLTE plan. The law further directed that use of Endowment revenues must be based on the learning technology plan adopted by the Legislature; and that the MLTE plan must take effect no later than the start of the 2002-03 school year. The plan recommended by the Task Force must prepare students for a future economy that will rely heavily on technology and innovation and also "transform Maine into the premier state for utilizing technology in kindergarten to grade 12 education."

Duties Charged to the Task Force

The Task Force was established to consider and make recommendations to the Legislature on issues pertaining to the structure, oversight and operation of the Endowment and the implementation of the MLTE plan. The Task Force was charged with the following duties:

A. Recommend the ongoing structure, governance and oversight of the MLTE;

B. Assess the current use of technology in the classrooms of the State;

C. Assess the current readiness of staff to teach using technology in the classroom and determine the need for professional development in the integration of technology in teaching;

D. Recommend strategy and goals for the integration of technology in the teaching of content areas and in the achievement of the learning results;

E. Recommend strategy and goals for improving and equalizing access to and use of technology in all school systems across the State;

F. Recommend a phased implementation design for the MLTE plan;

G. Recommend strategies that coordinate the resources and goals of the MLTE with the Maine School and Library Network (MSLN) and the telecommunications education access fund, including policies to maximize the capability of all student and teachers to access the MSLN or the Internet;

H. Coordinate strategies for kindergarten to grade 12 learning technology with technology initiatives and resources of Maine's public higher education institutions; and

I. Recommend a plan to track and assess progress in the implementation of goals set forth in the state learning technology plan.

The learning technology plan supported by the MLTE fund must be designed to take effect no later than the start of the 2002-03 school year.

Scope and Focus of the Task Force Process

The Task Force was convened on September 7, 2000, and held 8 other meetings. on the following dates: September 25th, October 10th, October 23rd, November 13th, November 27th, December 11th, December 18th and January 8, 2001. In addressing the specific charges presented to the Task Force, members received information and data from the following sources:

- Descriptions of state funding policies, the current status of learning technology in Maine schools and related telecommunications initiatives from Maine Public Utilities Commission and the Maine Department of Education officials. A background paper on ;

- Demonstrations of existing best practices and promising approaches in integrating learning technology into the classroom from Maine teachers, administrators and technology coordinators, educational technology consultants and researchers and practitioners in the fields of teacher preparation and professional development;

- A "test drive" of portable notebook computers and the opportunity to experience a state-of-the-art wireless environment similar to those in use in a number of Maine classrooms from "Spreading Educator to Educator Developments" (SEED);

- Two surveys commissioned by the Maine Department of Education, including the *Survey of Maine Educators' Use of Instructional Technology* conducted by the Maine Mathematics & Science Alliance (2000) and the *Electronic Technology Assessment Survey* conducted by the Maine Department of Education (1999);

- The public testimony of students, parents, teachers, administrators, school board members, librarians, business leaders, state and local public officials, educational policy researchers, educational technology specialists and practitioners who testified at a public hearing conducted over the distance learning network with participating sites in Gardiner, Gorham, Orono and Presque Isle;

- Reflections on lessons learned from existing success stories and images of future scenarios for harnessing learning technology to benefit teaching and learning from scholars involved in national and international technology innovation projects;

- Preliminary analyses of endowment investment strategies from the investment firm retained to advise the Board of Trustees of the Maine State Retirement System on its initial investment of the $50,000,000 MLTE fund;

- Current analyses of opportunities and challenges in integrating a learning technology initiative presented by spokespersons from the state planning office, Maine technology innovators and economic development agencies;

- Letters, e-mails and facsimile transmissions from students, teachers, administrators and other concerned citizens who offered noteworthy insights; and

- Descriptive analyses of existing technology solutions and financial modeling and revenue projections for the MLTE fund from senior information technology officials in state government.

Task Force members elected Representative Michael Brennan to chair the Task Force and used the first meeting to discern the purposes of the study and formulate a work plan. During the second meeting, Task Force members reviewed their charge, discussed the scope of relevant policy issues that warranted further consideration and established the following set of guiding principles to apply to their findings and recommendations for the MLTE plan:

1. Equity -- Promoting equal opportunity and providing meaningful access to learning technology resources for learners who are economically disadvantaged or have special needs;

2. Integration with Maine's Learning Results -- Supporting student achievement of Maine's Learning Results through the integration of learning technologies that are content-focused and can add value to existing instructional methods;

3. Sustainability/Avoiding Obsolescence -- Providing future sustainability of learning technology resources to adapt to future educational needs and to avoid obsolescence of learning technology resources;

4. Teacher Preparation and Professional Development -- Providing effective preparation, professional development and training programs for teachers and other educators in the use and integration of learning technology tools in curriculum development, instructional methods and student assessment systems; and

5. Economic Development -- Fostering economic development across all regions of the State and the preparation of students for a technology-rich economy.

The Task Force also agreed upon the following important policy issues:

- Vision -- Developing a bold vision regarding the integration of learning technology in the education of our children;

- Lifelong Learning -- Supporting lifelong learning for Maine citizens;

- Cost-Sharing -- Fostering the equitable sharing of costs between federal, state and local taxpayers and families, private sectors and philanthropists;

- Local Participation and Flexibility – Enabling local school units and communities to determine how the MLTE plan will complement local efforts, and providing the opportunity to use MLTE resources to meet and exceed the standards of the MLTE; and

- MLTE Governance and Administrative Structure -- Providing a governance and administrative structure that supports the effective investment, management and implementation of endowment funds and the learning technology resources in accordance with the MLTE plan.

Task Force members decided to devote the greater portion of their meetings on gathering data and information related to the charges directed to it and these guiding principles. In addition to the staffing assistance provided by the Legislative Council, the Task Force requested additional staffing and technical assistance from the Office of the Governor, the Department of Education, the Department of Administrative and Financial Services, the Maine State Library, the Maine Mathematics and Science Alliance and the

Maine State Retirement System. A bibliography of background information collected by Task Force staff and individuals who provided technical assistance for this study can be found on the Internet at "www.janus.state.me.us/education/technology/homepage.htm".

At its third meeting, the Task Force considered the existing State and federal funding programs and other currently available sources of funds that support learning technology initiatives in Maine schools. Following a presentation regarding the status of the $50,000,000 appropriation to the MLTE fund, the Task Force members established a subcommittee on investment and governance to review the finance and policy issues related to the appropriate investment strategies for the endowment fund and the most effective governance structure that can sustain the implementation of the MLTE plan. Janet Waldron, Commissioner of Administrative and Financial Services, was appointed to chair the subcommittee.

During its final two meetings, the Task Force reviewed the diversity of perspectives and the series of data provided to them. Task Force members deliberated over these findings and ultimately achieved a consensus on a number of conclusions and recommendations.

The enabling legislation established December 15, 2000, as the reporting date of the Task Force to the 119th Legislature. Due to the limited time in which the Task Force had to complete its work after the September 7th convening date, the Task Force chairs petitioned the Legislative Council for an extension of the reporting deadline and the Task Force was granted an extension until January 15, 2001. The legislation creating the Task Force also authorized the Joint Standing Committee on Education and Cultural Affairs of the 120th Legislature to report out any legislation necessary to implement the recommendations of the Task Force.

II. TRANSFORMING TEACHING AND LEARNING

"I skate to where the puck is going to be, not where it is."
-- *Wayne Gretzky, the NHL's all-time leading scorer, explaining how he scored so many goals*

Envisioning the Future of Education and Technology

We live in a world that is increasingly complex and where change is increasingly rampant. Driving much of this complexity and change are new concepts and a new economy based on powerful, ubiquitous computer technology linked to the Internet.

Twenty years ago, personal computers were a relative novelty. Today, two-thirds of Maine workers use computers in their workplace. Ten years ago, the Internet as we know it did not exist; today, it drives communication, information, entertainment, and the fortunes of stock market portfolios. From the complex to the mundane, in a thousand small and sometimes unnoticed ways, computer technology has permeated our economy and changed our lives. Some uses of electronic technology are so ubiquitous they are unnoticed – nearly all of us use ATM machines for routine banking transactions, for example. Many newsletters and bulletins are already beginning to transition to electronic-only distribution. Increasingly, examinations for graduate schools and for various professional licensing requirements are on-line – some exclusively on-line. The technological transformation is not limited to "high-tech" businesses; main-line manufacturing, farming, service and retail industries are increasingly harnessing computer technology to improve processes, boost productivity, and innovate new approaches to stay competitive.

Our schools are challenged to prepare young people to navigate and prosper in this world, with technology as an ally rather than an obstacle. The challenge is familiar, but the imperative is new: we must prepare young people to thrive in a world that doesn't exist yet, to grapple with problems and construct new knowledge which is barely visible to us today. It is no longer adequate to prepare some of our young people to high levels of learning and technological literacy; we must prepare *all* for the demands of a world in which workers and citizens will be required to use and create knowledge, and use technology as a powerful tool to do so.

If technology is a challenge for our educational system, it is also part of the solution. To move all students to high levels of learning and technological literacy, *all* students will need access to technology when and where it can be most effectively incorporated into learning. With the guidance of good teachers with technological facility, computer technology and the Internet can provide students with a pipeline to explore real world concepts, interact with real world experts, and analyze and solve real world problems. Computers and the Internet offer the potential to keep classroom resources and materials current with the contemporary world to an extent that is unprecedented. Computer technology also offers opportunities for self-directed, personalized learning projects that can tailor the curriculum to student interests and

engagement, and allow teachers to facilitate active student learning rather than merely the rote transfer of information.

We know that computer technology in schools – *learning technology* – done the right way can provide these tremendous boosts to teaching and learning. Hundreds of individual schools nationally and internationally have piloted "anytime, anywhere" learning technology, putting portable computers in the hands of students. Results are universally positive. Mistakes have been made, and those we can learn from. Others have tinkered but Maine can be first: *first* to recognize, as a State, the enormous potential of learning technology; and *first* to act boldly to prepare our schools and students to meet this challenging change.

The world is changing whether we will it or not; technology is here whether we embrace it or not. Maine has a powerful opportunity to act, and to harness technology as a powerful tool to our benefit. Information technology can help Maine construct an economy that overcomes the obstacle of distance and the constraints of climate. Embracing technology – and making Maine's schools and students the best in America at using it – can establish Maine as a leader and an innovator. If Maine can skate to where the puck is going to be, our goals will follow. If Maine has the most technology-savvy schools in the country and the most technologically capable workforce – we are confident the economic benefits will follow.

Vision

By definition, a learning technology plan must be forward looking. It does our students little good to invest in learning technology that matches yesterday's needs, or that will quickly fall short of tomorrow's aspirations. Rather, investments in technology must be aimed to meet the potential needs of education, society and the economy when students leave our schoolhouse doors over the next decade or two.

As its first essential characteristic, then, Maine's learning technology plan must be founded on a long-term, transformational vision. Though Task Force members claim no special clairvoyance, the Task Force sought to understand where Maine's economy and the State's educational system are headed over the next ten to twenty years, and to craft a program that is responsive to these potential trends.

Because our vantage point is limited, and our vision of the future sometimes clouded, it is equally essential that Maine's learning technology plan be dynamic and adaptable, and that individuals of talent and insight are empowered to evaluate, reassess, and redirect the plan as circumstances change.

For very concrete reasons, too, the Task Force believes that articulating a vision for learning technology that is ambitious, innovative, and transformational, will benefit Maine considerably. Though the Task Force has been careful not to presume the availability of additional, outside revenues, Task Force members are convinced that an ambitious and aggressive technology vision for Maine will increase the potential of

generating substantial interest and financial support from sources outside state government, including federal sources, private corporations, and foundation donors. The national interest and support generated by Maine's status as a technology leader and innovator will also positively impact Maine's ability to attract and retain good-paying jobs, and grow Maine businesses and our economy.

Envisioning the Future: Transforming Education Through Technology

Technology can help us to attain some of our most ambitious conceptions of what school is and how it should operate. Technology's potential in our schools has yet to be fully realized. The addition of technology cannot simply mean doing more of the same things, more efficiently. In order to be effective, technology use in our classrooms must support teaching based on how children learn. Students learn most by linking new information or knowledge to be learned, with what is meaningful to the student. The "construction" of meaning for students involves making sense of things that are observed, experienced, and taught. A constructivist approach supports and demands students to use higher-order thinking skills to make sense of the their experience.

This understanding of learning implies more extensive uses of technology than are apparent in many schools today. Technology helps achieve a vision about education. Few have articulated this vision better than Seymour Papert, one of the world's leading authorities on both the learning process and on technology. In this vision, school is a place where students learn largely by working on projects that connect with their own interests – their own visions of a place where they want to be, a thing they want to make or a subject they want to explore. The contribution of technology is that it makes possible projects that are both very difficult and very engaging.

This school is a place where the primary role of the teacher is not merely to provide information. The teacher helps the student *find* information and learn skills – including some that neither knew before. They are always learning together. The teacher brings wisdom, perspective and maturity to the learning. The student brings freshness and enthusiasm. All the time they are all meeting new ideas and building new skills that they need for their projects. Some of what they learn belongs to the disciplines schools have always recognized: reading and writing and mathematics and science and history. Some belongs to new disciplines or cut across disciplines. Most importantly, students and teachers are learning the art and skill and discipline of pursuing a vision through the frustrating and hard times of struggle and the rewarding times of getting closer to the goal.

Maine has addressed the equity gap in an important but limited sense by connecting every school to the Internet and so giving every child *potential* access to the Information Highway. But this is much less powerful than real individual, real-time access. Access to a personal computer that is available all the time is fundamentally different from the kind of access a student can get from a handful of computers in a classroom. Obviously, limited access is better than none, but such access will not

produce real educational equity. The one approach that will make a serious difference is ensuring that every child has access to a personal computer.

Ubiquitous, personally available, learning technology can help to transform the interests and natural curiosities of students into significant learning opportunities, in ways that other tools may not be powerful enough or versatile enough to achieve. A few examples illustrate this vision in action of the technology supporting change that is holistic and transformative.

Children everywhere fantasize about "what I'll be when I grow up." With technology, a student from rural Maine who dreams about a career in space can go on the Internet with NASA learning from scientists what they're doing, grasping what the student will have to master in order to pursue the dream.

A young child who unguided uses technology to play computer games, with *learning* technology can translate that interest and intensity into an academically relevant application like a flight simulator program designed for adults, flying real planes, capturing the same kind of excitement but with a challenging, real-world payoff.

Simply because the project is self-directed, mastering the goal of learning to fly is not easy: months of effort, passing simulated flight tests, knowledge of planes, airports, and geography. Experience with the flight simulator may require reading very far above "grade level" and understanding some mathematical ideas very, very far above "grade level." In the end, access to the computer gives this child the experience of learning what it is like to struggle bitterly hard to learn something he or she really wanted to learn and feel the reward of success.

A student with a non-technical interest, such as becoming a police officer, can research some of the necessary skills. He or she can use a driving simulator, then study the physics of skidding and join an Internet-based group of students of varied ages who were interested in the science of cars. He or she can enroll in an on-line course in statistics pitched to her level of mathematical background, and work with the Net group to put together a multi-media report on the relationship between car-theft and teen-age alcoholism across a variety of geographical locations.

Digital technology's power and versatility allows children's career fantasies – indeed, all their interests – to become occasions for important learning which will support whatever vocation they eventually follow.

Although these pursuits are mostly imagined, Task Force members can see their beginnings already in the testimony presented on Maine's own technology "pilot project," in M.S.A.D. 4 (Guilford). Thanks to a partnership between school, community and business, eighth graders in Piscataquis Community Middle School, located in one of Maine's rural mill towns, have been outfitted with laptop computers. After only a few short months, students and faculty were using computers to personalize learning, to

pursue more sophisticated, self-directed inquiries, to construct knowledge, in a learning environment that is fun.

The following table captures some of the changes in method that technology can spur or assist:

Traditional Classroom	Constructive Learning	Role of Technology
Textbooks and packaged materials	Primary source materials	Electronic data bases and Internet direct access to resource materials
Subject orientation with emphasis on covering content	Skill oriented with opportunities to explore and develop understanding of particular areas through projects and themes	Multimedia projects that integrate information from many resources. Contact with real practitioners via network use
Focus on isolated facts recognition and recall	Application of analysis and synthesis within real projects	Network collaboration use computer tools, probes and simulations
Text focused materials	Multimedia focus	Multimedia and simulations
Individual disciplines	Interdisciplinary. Focus is on integration through themes and interaction directly with scholars	Access to information and resources via networks on actual projects and on multimedia interactive systems
Rigid curriculum outlines	Student understanding drives instruction	Networking and other technology tools enhance instruction
Learning in school	Any time any where learning	Access to learning resources from off school, as well as at school
Shared computer access	Each student having computer access as needed	Each student having their own computing device

Task Force members also see the potential in the work of MIT professor Seymour Papert at Maine's juvenile detention facility, the Maine Youth Center in South Portland. Using computerized robotics and associated, advanced problems of design, engineering, and physics, Papert has seen technology change the course of learning for students who previously have failed – often spectacularly -- in school. The technology enables Papert and the students to work on projects such as building a motorized vehicle of Legos equipped with a programmable computer chip, in order to climb a steep ramp without tipping over.

Testing the designs leads the students into other ideas and gets them thinking about equilibrium, stability, center of gravity, power and all the factors that go into it. The project motivates students to learn about the underlying concepts *now*. In addition to

the physics, students write about what they're doing and record their building project using digital photographs and videotaping, and then store their archives in a portfolio. The engagement and focus produces -- from kids who have been marginal students, many diagnosed with learning disabilities -- ideas and solutions that impress even Papert with their insight, intelligence and creativity.

Technology is certainly not the only way to engage students in challenging, individualized, hands-on, project-based learning. For some students, a course in guitar-building, or the performing arts, or astronomy, could inspire similarly intense student interest and raise sophisticated, cross-disciplinary problems to be solved in the pursuit of the objective. But the unique capacity of computer technology in this regard lies in its analytic power and its versatility. Computer technology can be used to generate and pursue projects and problems in every discipline or area of interest. The computer technology can not only help frame a project, but also can provide an avenue for collecting information, constructing new knowledge, recording and analyzing data, communicating with others about challenges and solutions, and presenting the finished product. And personal computer technology can be accessible whenever and wherever the student wants and needs to work.

By itself, technology is not enough to transform teaching and learning styles, but it makes the change possible. Other changes may become necessary to realize the true potential. To change methods, a school may need to restructure its school program and class time to allow students more flexibility to energetically pursue immersion in the projects each student is working on. A rigidly segmented school day may no longer be necessary or even compatible with the project-based, immersion learning that is made possible by the technological and the pedagogical philosophy can be realized.

Technology can empower more teachers and students to do what our best teachers have been striving to do already: reach each student with powerful, personal learning opportunities. The goal of the technology endowment is to make learning more dynamic, engaging, and personalized – and extend learning well beyond the school walls. This goal can be achieved by the introduction of computing devices for each student. The devices and the necessary supports -- both technological and human – can enable the learning environment to allow Maine students to achieve our broader vision: Maine people are among the best educated in the world.

Guiding Principles

The Task Force has articulated five broad, guiding principles that embody our vision of the role of learning technology. Although the primary scope of the learning technology plan is harnessing the proceeds of the Maine Learning Technology Endowment to maximum effect, our guiding principles are intended to be broader in their implications. As a result, our proposed learning technology plan also addresses as appropriate connections and coordination with other technology infrastructure in the state, including the Maine School and Library Network (MSLN), public higher education institutions, and the Maine State Library. In some cases, Task Force members

recommend that existing resources in this infrastructure be deployed in a manner that will complement and enhance the components provided by the MLTE.

A. Equity

As computer technology becomes more powerful and prevalent in our society, concern is mounting over the so-called "digital divide" between individuals who have high levels of computer access at their fingertips and those who do not. Many of our Maine schools and students are on the wrong side of the digital divide, with school-based computers too few or too outdated and with meaningful access only for those students fortunate enough to have access to computers in their home. Even our best-equipped schools generally lack personal, on-demand, classroom access to computers, which available research indicates is the catalyst for true integration of computers and higher-level applications into teaching and learning.

The Task Force heard considerable evidence that lab-based computers, or other approaches with only limited or periodic access to computers, are inadequate to realize the educational potential of this technology. Higher numbers of lab-based computers will not produce equity in learning opportunities and do not solve the problem of many students lacking home access. When access is limited or periodic, teachers are unable to use computers in direct instruction. They are unable to use applications for classroom-based exploration, problem-solving, analytical, or demonstration functions. Teachers are unable to use computers as everyday tools to enable students to construct knowledge and to facilitate hands-on, project-based learning rather than lecturing. Without universal student access to computers when and where a student has need, teachers are unable to assign computer- or Internet-based homework and research problems.

At the individual level, the Task Force concludes that the definition of meaningful, equitable access for effective teaching and learning must be personal, one-to-one access by every student in the chosen grade(s) to the necessary computing power for research, communication, collaboration, analysis, and problem-solving applications. At a school unit/community level, the Task Force seeks to address equity by ensuring that the core components of the State's technology plan are available to all schools at no local cost. However, the Task Force recognizes that true equity must also reflect real differences. Thus, local school units would choose to participate in the State's learning technology initiative. And school units who can achieve one-to-one access and meet the other minimum parameters in the State's plan may, in lieu of participating in this initiative, apply for the equivalent value in the form of a technology grant. By supporting aggressive or innovative school units that can meet and exceed basic one-to-one access, the entire state will benefit from the experience of these technology leaders.

B. Integration with Maine's *Learning Results*

The Task Force believes that the needs of students and teachers, for effective teaching and learning, should define the technology to be adopted. The technology should not dictate the teaching and learning. The high standards for the ends of student

learning are described in Maine's *Learning Results*. The *Learning Results* make only a few explicit references to technology; rather, technology is a tool through which the standards can be achieved and with which students will need to demonstrate their skills in the real world of work and citizenship. In a technology-rich world, students will need to use technology as avenues of communication, problem-solving, work, citizenship, and lifelong learning.

One facet of successfully integrating technology is connected to concerns about equity. Equity is not the only, or even the strongest, reason for a one-to-one ratio of computers to students. The real potential in the educational impact of technology is about opening new ways of learning through having full-time access to a computer.

Imagine a country that has schools but has not yet invented writing. One day writing and pencils and paper and books are invented. Educators get the idea that these new technologies can help education. The boldest among them argue that they could afford to place a pencil and a book in every single classroom in the land.

A pencil in each classroom in our imaginary country might have provided some educational boost and would surely allow creative teachers to invent some new activities. But these innovations would not give even a hint at the holistic transformational effect the introduction of writing has had on the production and dissemination of knowledge.

Maine's Learning Results are for all, not just some, of our students. These high standards will require greater flexibility in teaching methods and personalization of student learning to move more students to higher levels. With personal access to powerful computing technology for each student and teacher in the classroom, technology can be a significant aid to more personalized exploration and learning. An additional, critical facet of integration with learning outcomes is the corresponding teacher involvement, training, and support that this necessarily implies.

Keeping learning at the center of this initiative also instructs how the State should address the technology involved. The Task Force has identified the feasibility of specific types of technology that are currently available and affordable. However, technology is rapidly changing and improving. Therefore, the Task Force recommends that the descriptions of technology in the State's learning technology plan should be general enough to be adaptable to future needs, and should be subject to periodic reexamination in light of the appropriate fit with learning results and the evolving needs of students and teachers.

C. Sustainability/Avoiding Obsolescence

A program of this magnitude must be carefully planned and structured to give a high probability of success. Many states and individual school districts have encountered substantial difficulties after investing large one-time funds in technology hardware, only to face many unrecognized costs and a new bulge of need as the hardware became obsolete. A program may not be sustainable if it is ineffective. A program will not be

sustainable if current or future costs are excluded, underestimated or left to chance. A program will not be sustainable if it cannot adapt to meet changing future needs. In order to assure the sustainability of the learning technology initiative, the program adopted (1) must address the full range of components needed to make effective use of the technology; and (2) must address the total costs of ownership (TCO) of the technology.

The Task Force has crafted a plan that is intended to ensure sustainability. The Task Force believes the plan must begin by limiting expenditures from the Endowment to the earnings generated, leaving the Endowment principal to generate resources for technology investments over a long-term. In addition, the Task Force used reasonable estimates of expected earnings, fundraising potential, and project costs. The Task Force included key elements of infrastructure beyond computing devices, to include statewide and school-based networking, technical support, teacher training and development, home Internet access for all students, and access to primary research content. The Task Force included the total cost of the technology, including a conservatively estimated life-span and replacement cycle for equipment. Finally, Task Force members have proposed a dynamic structure for planning and governance, with an Advisory Board and Commissioners empowered to evaluate, adapt, and propose legislative deployment of technology funds as future needs warrant.

D. Teacher Preparation & Professional Development

To maximize its power and potential, learning technology must be truly integrated and embedded in daily teaching and learning. For this to happen, teachers must be adequately equipped and supported to adapt their teaching methods around the use of technology. Without a significant commitment to teacher support, the initiative will fall significantly short of our ambitious goals. Intensive, out-of-class training experiences for teachers are ineffective if access to technology in the classroom does not exist for teachers to apply, explore, and experiment with the new technology while working with students. The focus of teacher development must change from teaching teachers about technology, to helping teachers to integrate, to improve their teaching by using technology as a tool.

Considerable evidence presented to the Task Force suggested that in order for technology to be integrated into teaching in a truly effective fashion, two things are critical: (1) teachers and students must have personal access to computing technology in the classroom; (2) training and professional development in the use of technology must be delivered to teachers in an integrated, immersed way with ample opportunity for hands on exploration and practice for the teacher-as-learner using the technology with students in the classroom.

The Task Force recommends that every teacher be equipped with the same learning technology as their students so that teachers will be assured access in order to obtain optimum use in teaching. The Task Force further recommends that a "just-in-time", classroom-based, integration-focused approach to teacher professional

development be a core commitment of the Endowment proceeds, as well as a high priority for additional grant-writing and fundraising efforts.

E. Economic Development

A well-educated, high-quality workforce is the number one economic development strategy that Maine must have. Business development experts report that decisions about expansions and location are made based first and foremost on the availability of a high-quality, educated, and adaptable workforce. An increasing proportion of available jobs, especially in traditional, mainline industries, require an increasingly high level of technology skills and literacy to succeed. The educational use of technology must reflect and support the technological trends and needs in the workforce and the economy. Our schools must produce students who are technologically skilled and technology-literate.

As with technology's impact on educational standards, the important point here is not simply that Maine's graduating students will know how to use technology. Rather, they will be better communicators, problem-solvers, workers, and collaborators, with better content knowledge, as a result of using technology. Maine students will know how to use technology to find things, create things, analyze things, and expand their skills and abilities.

Other Primary Policy Considerations

Task Force members have addressed the need for *vision*, and the guiding principles sweep in and extend to the benefits to *lifelong learning*. *Structure, governance*, and fair *cost-sharing* are developed in more detail in our recommended MLTE plan in Part IV. Thus, it is necessary to say more here about our approach to *local participation and flexibility*.

Local Participation and Flexibility

A final component of our vision is that Maine is a place where local needs, local participation, and local control are paramount concerns. Our state learning technology plan seeks to honor this local character by empowering communities to opt-in to this computer initiative. Some of the Endowment funds will permit local flexibility in deployment. Course content will be selected locally. Home use and Internet filtering policies will be determined locally. Task Force members also propose allowing local school units the option of receiving grants to achieve the requisite levels of access by some alternative means.

The Task Force received some testimony that the MLTE and other initiatives ought to be deployed simply to support existing local technology plans that are currently being implemented. At the present time, the Task force does not believe that this approach would be consistent with our legislative charge to use technology to transform

teaching and learning. While some school districts have been true innovators, the local technology plans generally were designed for a far different and more limited purpose.

Task Force members learned that not every school unit has a local technology plan. The Task Force explored samples of some of the best local technology plans. By nature, these plans are designed to be limited and incremental in scope. They define what the local district believes is achievable over a 3-year period, usually for purposes of deploying a modest federal technology grant. Of course, these plans do not reflect, nor could they have reflected, the availability of a significant outside resource such as the MLTE. Although many of the local plans reveal concerns about equity and access, this is expressed in terms of improving student-to-computer ratios without consideration of the transformational impact of one-to-one access.

Rather than simply funding existing local technology plans that have guided the current phase of education technology, Task Force members believe that the use of learning technology is entering a new phase, and the Endowment should be used to advance this next step. At this point, the question should not be whether to fund local technology plans, but what would such local plans look like if the State were able to do what has never been done, provide a common level of personal computer access to each student?

The creation of the Endowment and a statewide program does not remove the need for local technology planning. The Task Force hopes that local technology plans will evolve to reflect the potential of universal, personal, classroom- and home-based access to computers. Significant local resources are devoted to learning technology, and the Endowment is not intended to replace those resources. Local effort and planning will be needed to address other technology needs that supplement and complement the basic level of access that a statewide program can provide.

III. SUMMARY OF KEY FINDINGS

In establishing the Task Force on the Maine Learning Technology Endowment, the 119th Legislature sought to focus the study on analyzing current state policies and existing learning technology initiatives before developing a plan to utilize the revenues from the Maine Learning Technology Endowment (MLTE) to transform Maine into the premier state for utilizing technology in kindergarten to grade 12 education. The Task Force began its work by establishing a set of guiding principles. The findings that follow reflect a summary of the data collected and the information received by Task Force members related to the duties charged to the Task Force. A list of those who presented informational briefings, served on discussion panels, provided technical assistance and other resources to the Task Force is presented in **Appendix C**.

Findings Regarding Governance of the MLTE Fund

A primary policy consideration of Task Force members was to design a governance and administrative structure that will support the effective investment, management and implementation of endowment funds and the learning technology resources in accordance with the MLTE plan. With respect to the governance and investment of the MLTE fund, statutes require that the Commissioner of Administrative and Financial Services (DAFS) act as fiduciary with respect to the management and administration of the endowment to ensure that deposits into the endowment are held in trust on behalf of the State for the purposes specified in the MLTE plan. State law further directs the Board of Trustees of the Maine State Retirement System (MSRS) to invest endowment funds in the same manner and according to the same investment policy and practices by which the MSRS Board invests MSRS assets.

Janet Waldron, DAFS Commissioner, and Kay Evans, MSRS Executive Director, presented a jointly-developed "memorandum of understanding" to the Task Force. As required by law, the memorandum sets out their mutual understanding of the investment of the $50,000,000 appropriation that capitalized the endowment, including the related investment accounting, investment return and expense attribution for the MLTE fund. The MSRS Board asserted that its expertise lies in the investment of pension fund assets, not in the investment of endowment fund assets; and that its investment policy, including the types of investments made and the size of the investment in each type, is structured to serve the particular realities and needs of a pension fund, with which those of the endowment fund may or may not be congruent. The Board, concluding that it could responsibly undertake the near-term investment of MLTE funds pending the adoption of a plan that would guide actual utilization of the funds, engaged an investment consultant with expertise to advise the Board in the near-term and to assist the Task Force in addressing the issues of an investment strategy to reflect the technology plan.

As stated earlier, the Task Force established a subcommittee on investment and governance to review the finance and policy issues related to the appropriate investment strategies for the endowment fund and the most effective governance structure that can sustain the implementation of the MLTE plan. With the assistance of an investment

consultant engaged to advise both the MSRS Board and the Task Force on the investment of MLTE funds, the subcommittee reviewed a set of assumptions designed to allow the forecasting of potential returns of the endowment. Subcommittee members also discussed the broader finance and policy issues related to the appropriate investment strategies for the endowment fund, including the creation of a governance structure that can sustain the implementation of the MLTE plan. Subcommittee analyses produced the following finding and conclusions:

- An investment strategy depends upon the period of time established by the Task Force for the endowment to fund the technology plan (e.g., "*in perpetuity*" or for an agreed upon time period), whether the anticipated yield should be based on the nominal value or real value (i.e., adjusted for inflation) and the timing and sequence for disbursal of funds from the endowment;

- In the absence of an established MLTE plan for the use of the endowment funds, the MSRS Board and the DAFS Commissioner launched a short-term investment strategy to preserve the MLTE principal; the MLTE plan must be fleshed-out before a long-term investment strategy can be drawn up and deployed;

- The MLTE plan should include proposed statutory language to clarify the philosophy, legal status, membership and authority of the governance structure;

- The MLTE plan should establish an investment strategy and spending policies, including investment oversight, parameters and expectations such as term and size of the endowment, restrictions on capital and income, allocation strategy, need and program expectations and intergenerational equity;

- The established investment strategy must address the issue of sustainability of funding to implement the MLTE plan, as well as the expectations for the acceptance of gifts, that is to say, should these gifts be used for current expenditures or invested as principal; and

- The MLTE plan should establish a system for financial reporting, including auditing and monitoring functions.

Findings Regarding the Current Use of Technology in Maine Classrooms

Two surveys commissioned by the Maine Department of Education, combined with comparative data from national reports of state-level assessments, formed the basis of the findings related to the current use of technology in classrooms in the State. In 1999, the Department of Education conducted an *Electronic Technology Assessment Survey* (DOE 1999). Findings from this online survey were augmented with other sources of Maine-specific data to provide Task Force members with a greater understanding of student and teacher access to computers and the status of equity in the State (the full report of findings from this survey can be found on the Internet at

"www.janus.state.me.us/education/technology/homepage.htm"). Analyses of the key findings from the DOE 1999 survey resulted in the following conclusions:

Student Access to Computers

- Student-to-computer classroom ratios vary from 10 to 1 in secondary grades, to nearly 15 to 1 in middle school grades, and a range of 16 to 1 in kindergarten to 13 to 1 in grades 1 through 5;

- When alternate locations (i.e., computer labs, science labs or libraries) were added to classrooms, student-to-computer ratios for K-12 classrooms overall were 7 to 1;

- The Maine average for the ratio of students-to-Internet computers was 11 to 1 compared to a national average of 13 to 1;

- 21% of elementary schools reported an 8 to 1 student-to-classroom Internet computer ratio (or better) compared to a 22% rate reported by middle/high schools in the survey; at the other end of the continuum, 32% of elementary schools reported an 20 to 1 student-to-classroom Internet computer ratio (or worse) compared to a 27% rate reported by middle/high schools;

- Regional differences in student-to-classroom Internet computer ratios at the elementary school level ranged from nearly 15 to 1 in Penobscot & Piscataquis and Kennebec & Somerset regions, to nearly 16 to 1 in the Aroostook region, to nearly 17.5 to 1 in Sagadahoc, Lincoln, Knox & Waldo and Washington & Hancock regions, to roughly 20 to 1 in Androscoggin, Oxford & Franklin and Cumberland & York regions;

- When comparing the same ratio of students-to-Internet computers for "high poverty schools," Maine averaged 6 students to 1 Internet computer compared to the national average of 19 students to 1 Internet computer;

- The percentage of Maine schools with Internet computer lab(s) responding to the survey included: 56% of elementary schools, 75% of junior/senior high schools, 83% of junior/senior high schools, and 93% of high schools;

- Compared to other states, Maine ranks 15th in offering student access to Internet-ready computers, yet 31st in offering student access to instructional computers;

- When comparing the per pupil spending on technology, Maine schools spent $72 per pupil in 1997-98 and $109 per pupil in 1998-99; the national average in 1998-99 was $144 per pupil;

- In Maine, the percentage of a local school unit budget devoted to technology in 1998-99 was 1.54% compared to the national average of 3.6%.

Teacher Access to Computers

The Maine Mathematics & Science Alliance launched a *Survey of Maine Educators' Use of Instructional Technology* (MMSA 2000) soon after the Task Force was convened. Sponsored by the Department of Education, this survey was mailed to every K-12 teacher in the State to learn about their access to and use of instructional technology. With responses from nearly 3,500 teachers (24% response rate), this sample is representative of Maine teachers across all grade levels, in schools located in all counties, across the major subject content areas and of teachers with various years of teaching experience (the full report of findings from this survey can be found on the Internet at "www.janus.state.me.us/education/technology/homepage.htm"). The key findings from this survey include the following:

- Nearly a third of Maine teachers (30%) from all grade levels, years of experience and geographic region, frequently use computers for assistance in their own professional work, while almost half (47%) are infrequent users of computers;

- An exception to this trend is found in very practical applications that are limited to daily activities, such as frequent use to create instructional materials (63%), communicating with colleagues (55%), administrative record keeping (43%);

- Maine teachers use computers infrequently or not at all for the types of applications that extend what and how they teach, such as planning lessons, researching model lessons or best teaching practices, multimedia presentations, professional development or learning content using the Internet, or locating or communicating with students or parents;

- Almost 90% of Maine teachers have computer access either at home or in their classroom, and most have both; the primary place where teachers use computers with students is in the classroom, even when there is access in another school location;

- Nearly 70% of Maine teachers have access to multiple computers in school, but only 30% have access to 2-5 computers or more in their own classroom; and only 20% of teachers have access to 2-5 computers or more in their own classroom connected to the Internet;

- Only 20% of Maine teachers work in a classroom with 15 or more computers (or approximately one computer per student);

- Maine teachers with access to multiple computers in their classroom are using the computers at a more complex level – for example, newer or more sophisticated applications such as Web quests, data analysis, homework help, simulations or demonstrations -- and to a greater extent than those that do not (approximately 30% points higher);

- ❖ Teachers would prefer to have much greater access to multiple computers in their own classroom than have additional computers in a computer lab within their school;

- ❖ Many computers currently used by teachers are outdated, and are often unreliable or nonworking equipment;

- ❖ Teachers want and need professional development and support to learn more about the integration of computer technology into the classroom; and

- ❖ Professional development is linked to the extent to which teachers will use a computer; teachers cited the need for quality professional development on-site, but it wasn't always clear whether they meant a content specialist, integrator or technical support specialist.

Findings Regarding the Current Readiness of Staff to Teach Using Technology and the Need for Professional Development in Integrating Technology in the Classroom

The preparation and professional development of Maine teachers and other educational professionals involved in the implementation of such an initiative are paramount concerns. The Task Force guiding principles cite the need to provide effective preparation, professional development and training programs for teachers and other educators in the use and integration of learning technology tools in curriculum development, instructional methods and student assessment systems. Task Force members devoted a great deal of its meeting time engaged in discussion with key informants to explore the existing capacity to use learning technology resources available in Maine schools. The Task Force was impressed with the innovative and distinctive spirit and the diverse perspectives with which Maine educators have embraced the challenges and opportunities of providing educator preparation curricula and professional development programming for Maine educators in the integration of learning technology that can support student achievement of Maine's *Learning Results*.

Professional Development and Learning Technology

A series of presentations, demonstrations and panel discussions involving Maine educators, Department of Education and other state agency officials, Maine higher education faculty, and learning technology consultants presented perspectives on professional development from the research literature and from the field. These key informants also discussed recent successes and obstacles to overcome in effectively integrating learning technologies in schools. Taken together, these technology-savvy educators and educational technology consultants presented insights into how individual initiatives, regional consortia and statewide networks are creating "best practices" in professional development that support the use of technology to improve teaching and learning, as well as the outlook for future professional development practices needed to support various levels of technology saturation. On the basis of these presentations, the Task Force finds that:

- A teacher's learning takes place in multiple settings -- workshops, in-school learning, out-of-school learning (beyond school boundary);

- Workshops do not guarantee teachers will effectively implement curriculum, but application of "seeing, demonstrating and practicing" methods do enhance implementation so that new learnings become part of the educator's skill set;

- "New" models are expanding the professional development repertoire far beyond typical in-service training to a deeper focus of connecting with the appropriate content and pedagogy of a discipline;

- Effective professional development models are promoted teacher to teacher, and teachers are learning best by implementing professional development within the classroom where time is less of an issue if they can "embed" professional development by using tools and strategies within the classroom;

- Efficacy motivates teacher learning -- if it will help student learning improve, they will use it;

- Teachers need content-based professional development focused on content knowledge and technological skills; and where small clusters of professional educators come together as communities of learners and can connect with trained facilitators who know about both pedagogy and technology;

- Meaningful "mind tools" can be applied in different ways with learners developing an intellectual partnership with learning tools, and in the process, enhancing these tools and allowing the tools to enhance their learning;

- Such meaningful tools have to be learned just-in-time, with timely access to on-site staff; have to be relevant to teachers and their students; supported in school from all levels; and regionalized with partnerships in all regions;

- Research shows that there's an 80% correlation between transformative professional development and increased student achievement;

- A new initiative to produce and distribute a video series of effective technology presentations to teachers (via video, Maine Public Television, cable television, the Internet, etc.) can create increased awareness of teachers, parents, citizens and may generate increased support for innovative approaches to public education; and

- The integration of learning technology must support teaching and learning; therefore, the evaluation of learning technology must measure its contribution to student achievement of learning outcomes.

Educator Preparation Programs and Educational Technology Standards

- Maine teacher preparation programs draw upon the expertise of in-service teachers in a pre-service teacher's practicum and use a results-driven model where it can be seen and known when teachers and students are practicing effectively;

- It's not easy to replicate this results-driven model in the real world, since it's difficult to find technology-rich classrooms in which to place pre-service teachers;

- Several national projects have provided standards and resources for preparing and training teachers to integrate classroom technology; and these standards expect proficiency in working with learning technology tools before a student teacher uses them in an educational context;

- Educator preparation programs in Maine are seeing varying levels of student readiness between traditional students and non-traditional students, who often don't have the same preparation or skill sets coming into these programs;

- Learning technology competencies should be addressed in the competency-based standards for State licensure and certification of teachers and other professional educators; professional development requirements for educator should also include a technology goal component in individual improvement plans;

- Statewide access to preparation and professional development opportunities should be provided via on-line courses and Electronic Learning Marketplace to prepare the next generation of teachers and educational leaders; and

- Schools need educators with vision, a willingness to integrate learning technology to enhance student learning and adequate resources to provide meaningful access to the learning technology to meet student needs, all on a "parallel track."

Findings Regarding Technology Integration and Achieving the Learning Results

Task Force members supported the perspective that learning technology tools are a "means" to learning and not an "end" in and of themselves. The integration of learning technology resources must, therefore, support student achievement of the content area standards contained in Maine's *Learning Results*. The Task Force guiding principle stating that "supporting student achievement of Maine's *Learning Results* through the integration of learning technologies that are content-focused and can add value to existing instructional methods" is aligned with the vision and guiding principles of Maine educational policy that Maine students will be among the best educated and will be among the most technologically literate in the world. Task Force members were provided with outstanding illustrations of how Maine teachers are currently integrating learning technology tools in ways that incorporate standards and empower individual and collaborative learning. Task Force analyses concluded the following on the basis of these presentations:

- ❖ Technology is emerging as an essential tool for meeting *Learning Results*; the deployment of learning technology tools can have a significant relationship to each of the guiding principles from the *Learning Results*;

- ❖ The "Generation www.Y project" at Sacopee Valley H.S. -- where students teach their peers and even their teachers and community members -- represents the type of collaborative learning initiative possible when learning technology is integrated into teaching and learning;

- ❖ The MSAD #4 & Guilford of Maine partnership at the Piscataquis Middle School demonstrates the potential for one-to-one computer access and how "anytime, anywhere learning" changes the dynamic between teachers and students; MSAD #4 educators report a phenomenal improvement in what students and teachers can do with full-time access to learning technology in school and elsewhere and indicate they are observing real conversations between learners and teachers, and deeper learning results;

- ❖ Gardiner educators indicate that a 6-year infusion of technology targeted to improving student literacy has resulted in striking improvement; in 1994, 37% of students were reading below 3rd grade level and 94% now read at grade level; and

1. Gardiner High School also reported that in its "career essentials" course, students spend time on 15 technology modules and work on robotics, the integration of math, science and technology and are now required to learn Excel, Power Point and Access; and related plans to develop electronic portfolios in their "career essentials II" course.

Findings Regarding Improving and Equalizing Access

The Task Force defined equity of access in terms of promoting equal opportunity and providing meaningful access to learning technology resources for all learners, including students who are economically disadvantaged or have special needs. Beyond the examples of "anytime, anywhere learning" found in the Maine schools noted above, the Task Force sought to gain perspective from lessons learned in other states, particularly with respect to state initiatives that provide both an equal opportunity and meaningful access to learning technology. Dr. Dale Mann, a Columbia University Professor with over 35 years of experience in the educational policy arenas at the federal and state levels, presented a number of lessons learned from his experience in assisting West Virginia with the development of their state learning technology initiative, the "Basic Skills/Computer Education" Program ("BS/CE"). Findings from Dr. Mann's presentation are summarized below:

- Three "Drivers" of the West Virginia Learning Technology Policy:

  1. Access – Enough equipment for there to be an opportunity to learn. West Virginia has a coal economy, is a resource-challenged state lacking enough funds to provide learning technology for all children at all grade levels. So, they focused on building a "critical mass" by providing 1 computer for every 4 students and implementing a "follow-through" strategy where every kindergarten student and teacher was provided with learning technology resources, including paid training for teachers, then saturated the 1st grade level the next year, and so on. While computer lab installations were a necessary phase, West Virginia schools found that distributing equipment to the classrooms is what wins.

  2. Training – The chance for teachers to learn how to use computers. West Virginia strategy focused on support for teachers by providing an intensive two-week training program. West Virginia also established a policy of only supporting IBM platforms and MS software with state funds; making it feasible to set up a county–based technical support system; and

  3. Attitude – The belief that instructional technology helps students learn, and thus, the will to use it. The more model components and the more completely teachers and schools implemented the BS/CE, the better the students performed.

- West Virginia "Bottom Line" -- Technology only works if there is a "CDS Policy":

  1. Concentrated – Create a "critical mass" and use follow-through strategies;

  2. Distributed – Integrate into the classroom, available to teachers and students; and

  3. Sustained – Funding and professional development over time.

- Four Learning Technology "Gotta's" -- Improve test scores, increase efficiency, make teachers more successful and connect all the educators (media, peers and family);

- Results of West Virginia's BS/CE Program -- All children's performance benefited:

  1. The greater the increase in access to computer technology, the better the student did; and the biggest gains were for those students without computers at home;

  2. State officials saw an 11% increase in gain score growth for 5th graders in basic skills; the program was equally helpful to both male and female students; and

  3. Ranked by per capita income, West Virginia is 40th, but ranked by student achievement, West Virginia is now 11th having improved from 33rd to 11th in student achievement rankings.

West Virginia's learning technology infusion is currently in the 10th grade. Funding increases, roughly at the level of inflation, were necessary to secure the sustainability of the BS/CE program. West Virginia leadership created and sustained a coalition that has supported 10 years of annual state appropriations.

Dr. Mann cited the landmark 1966 study by Coleman on the sources of educational achievement as support for the perspective that student learning is influenced by the family, the media, peers and the school, with 70% of the influence coming from *outside* of school and 30% from *within* the school. Therefore, school reform has more to do with engaging parents and outside influences than putting all the pressure on administrators, teachers and schools. Suggesting that John Dewey's insight that "we practically never teach anything by direct instruction, we teach by the creation of settings," he proposed that the Task Force plan should include "other educators" as part of the learning enterprise and that Maine educational policy should focus on creating a "critical mass" by moving digital learning technology to the learner. He concluded with the proposal that endowing all students with one-to-one access to learning technology tools and "anytime, anywhere learning" provides these students with more equitable and meaningful access than allocating one computer to every classroom in the State or equipping a computer lab with computers that students may only get the chance to use once in a while.

Findings Regarding Coordinating Technology Initiatives and Resources

The Task Force received a detailed report on the chronology and scope of activities related to a variety of learning technology initiatives and resources that have made a tremendous impact on schools across the State. A "Chronology of Learning Technology Activity in Maine" is presented in **Appendix D**. By all accounts, Maine schools and libraries are fortunate to have an extraordinary level of connectivity to the Internet provided through the Maine School and Library Network (MSLN) "backbone." A background paper on the MSLN, the Federal E-Rate and the State E-Rate is presented in **Appendix E**. The emerging Interactive Distance Learning Network also promises to complement this first-rate telecommunications and distance learning infrastructure. Task Force members were encouraged to expand upon this foundation by complementing the statewide initiatives and resources summarized below:

Interactive Distance Learning Network (Asynchronous Transfer Mode)

- $15,000,000 bond approved by the Maine Legislature and citizens of Maine;
- 170 eligible educational sites; 22 sites currently deployed;
- 2-way interactive audio/video conferencing for classroom instruction;
- Bandwidth equivalent to 5 "T-1" connections;
- Available 24 hours/day 7 days/week for instruction and community use.

The Maine School Library Network (MSLN)

- Established by PUC order in 1996 that NYNEX (later Bell Atlantic and now Verizon) provide funds to connect schools and libraries to the Internet;

- The current Maine School and Library Network provides free Internet service, and a connection to the Internet via a 56 Kbps frame relay or T-1 connection, to approximately 1100 Maine schools and libraries;

- Currently 107 sites have chosen alternative means of obtaining Internet access (primarily via cable systems);

- Funding for the MSLN has come from Verizon ratepayers and ends in June 2000; PUC voted in July, 1999 to extend the MSLN through June 31, 2001 until the Maine Telecommunications Education Access Fund (State E-Rate) begins;

- Beginning in July, 2001, State E-Rate will complement Federal E-Rate to eliminate expenses for eligible schools.

The Maine Telecommunications Education Access Fund (MTEAF)

- Established by the Legislature in 1999;

- Supported by funds from telecommunication carriers;

- Extends free Internet access provided by MSLN; serves as the "State E-Rate";

- Besides Internet connections, supports other telecommunications services, computers and training;

- Schools and libraries must apply for any available federal discounts before using state E-Rate funds;

- Begins July 1, 2001 at an anticipated $3,000,000 per year;

- 25% of total from MTEAF to be spent on innovative projects; and

- The Commission has directed that the unspent funds remaining with Verizon after June 2001 will be used to benefit schools and libraries in a manner as yet to be specified.

Federal Telecommunications Act of 1996 (Federal E-Rate)

- Congress created the Universal Service Fund for Schools and Libraries (or "E-Rate") as part of the Telecommunications Act of 1996, to provide discounts on the cost of telecommunications services and equipment to all public and private

schools and libraries;

- Supported by funds from telecommunications carriers;
- Subsidizes telecommunications services for schools and libraries (from 20% to 90% based on "free & reduced lunch" eligibility);
- Subsidizes regular voice, data, video, phone service, Internet access, equipment, and network services;
- Eligible services range from basic local and long-distance phone services and Internet access services, to the acquisition and installation of equipment to provide network wiring within school and library buildings;
- Computer hardware and software, staff training, and electrical upgrades are not covered; and
- Provided $3,000,000 in 1999 to Maine schools and libraries.

The Federal Goals 2000 Technology Literacy Challenge Funds (TLCF)

- Provides grants to schools to subsidize the implementation of their local instructional technology plans;
- $2,000,000 per year;
- 122 districts received TCLF grants in 1999.

Federal Entitlement Funds Distributed by State (Maine DOE)

- Maine received approximately $644,000 in Title I funds (Elementary & Secondary Education Act [ESEA], Title I, Helping Disadvantaged Children Meet High Standards);
- Maine received approximately $110,000 in Title II funds (ESEA, Title II, Eisenhower Professional Development Program) for staff development;
- Maine received approximately $469,000 in Title VI funds (ESEA, Title VI, Innovative Education Program) for technology and staff development;
- Maine schools received approximately $678,000 in Carl Perkins funds (Vocational Education Program) for technology;
- Maine schools received approximately $760,000 in Special Services funds (for targeted populations).

Federal Competitive Grant Funds

- Southern Maine Partnership received a 1996 Technology Innovative Challenge Grant to develop the Electronic Learning Marketplace (ELM);

- Maine Center for Educational Services received a 1999 Technology Innovative Challenge Grant to develop and evaluate professional development; established "Spreading Educator to Educator Developments" (SEED);

- University of Maine, University of Southern Maine and the University of Maine Penobscot River Educational Partnership received Preparing Tomorrow's Teachers to Use Technology (PT3) grants in 1999-2002 to prepare and train teachers to use instructional technology.

Private Sector Initiatives & Resources

- Gates Foundation *Leadership* Grant provides professional development opportunities to superintendents and principals to provide leadership regarding instructional technology;

- Maine awarded $2,700,000 leadership grant (over 3 years) from 2001-2003;

- Gates Foundation *Teacher* Grant to provide professional development opportunities to teachers regarding instructional technology;

- Maine to apply for teacher grants that will be awarded sometime in 2001.

Potential Future Funding Sources

The Task Force received testimony that considerable donations, grants and other funds are feasible to supplement the $50 million appropriated by the Legislature to the Endowment. The federal government has several substantial technology grant programs that are discretionary and competitive. Several foundations have historically provided multimillion-dollar grants for innovative technology integration. Numerous corporate entities have contacted state officials regarding their willingness to provide funding, in-kind contributions, or reduced-pricing opportunities. Potential resources that may be available in the future to fund the integration of learning technologies in Maine include: the Gates Foundation, National Semiconductor, Verizon, MBNA, L.L. Bean, UNUM Provident, the Kellogg Foundation and the Libra Foundation.

Postsecondary Education & Public Sector Initiatives & Resources

The Task Force received considerable public testimony from representatives of Maine colleges and universities, the Maine State Library, local libraries, the Maine Public Broadcasting Corporation, the Public Utilities Commission and other entities regarding the need to give due consideration to integrating and coordinating, the MLTE plan with

the various initiatives and resources they have underway or available to Maine schools. The Task Force finds that the learning technology plan should, to the extent possible, seek collaborative endeavors with these entities to further the purposes of the Endowment. For example, the public and private institutions of higher education in the state and the Maine Public Broadcasting Corporation may be able to assist in the provision of teacher training and support.

Findings Regarding a Phased Implementation Plan and Assessing Progress in the Implementation of MLTE Goals

A number of issues raised during panel discussions with presenters have influenced the deliberations of the Task Force regarding the charges to consider a "phased-in" implementation plan, as well as the assessment of the implementation of the MLTE plan. The Task Force soon realized that the MLTE plan goes well beyond a simple proposal to purchase devices. Furthermore, with the rapid pace of technology innovation, the corresponding changes in the cost of digital technology and the variability of short-term finance markets, there are considerable uncertainties in projecting technology needs, their associated costs and the available revenues for more than just a few years at a time.

Current law requires that the MLTE plan will begin in the 2002-03 school year. To achieve this ambitious undertaking, the MLTE plan must be comprehensive in anticipating the array of components, costs and support programs and services that are associated with the large-scale deployment of computer technology. The MLTE plan must coordinate and utilize the proceeds from the Endowment to expand existing capacity in a manner that complements and supports the Endowment. Given these and other factors, the Task Force has focused on articulating a long-range goal for the Endowment and then defining with greater specificity the initial phase of implementation the first few years of the plan. The Task Force has also given further consideration to the factors that would need to be assessed to guide the planning and deployment of subsequent implementation phases.

The Task Force received testimony that the proposed MLTE plan must be implemented in an incremental fashion to be successful. By "phasing-in" implementation, the plan may permit greater collaboration with appropriate entities and allow continuous assessment of the emerging opportunities and threats to ensure that the overall learning technology infrastructure of the State functions and expands in a coordinated fashion. The Task Force finds that to accomplish these purposes, the governance and administrative structure must be developed to support the effective investment, management, implementation and evaluation of the MLTE plan; and that the MLTE plan should, where appropriate and feasible, collaborate with educational and other institutions in the State regarding the design and implementation of evaluation measures for the MLTE plan.

Findings Regarding Workforce and Economic Development

The Task Force finds that preparing students for a technology-rich economy and fostering economic development across all regions of the State are critical guiding principles for the use of the MLTE. The Task Force received testimony that a well-educated, high-quality workforce is the number one economic development strategy that Maine must have. State officials and business development experts reported that decisions about business expansions and locations are made based first and foremost on the availability of a high quality, educated and adaptable workforce. An increasing proportion of available jobs, especially in traditional, mainline industries, require an increasingly high level of technology skills and literacy to succeed. The educational use of technology must reflect and support the technological trends and needs in the workforce and the economy. Our schools must produce students who are technologically skilled and technology-literate.

Officials from the State Planning Office ("SPO") and the Department of Economic and Community Development ("DECD"), as well as spokespersons from innovative Maine businesses, provided the Task Force with their perspectives on current opportunities and challenges in integrating the learning technology initiative with economic development strategies for Maine. SPO analyses of national data regarding economic development concluded that we live in a "knowledge-based economy" where two factors explain the differences in state per capita incomes:

1. *Educational attainment* – as measured by the percentage of the adult population, 25 years and older, with at least a 4-year college degree (Maine lags the national average by 5%); and

2. *State spending on research and development (R&D)* -- as measured by the R&D dollars spent per employed worker (Maine ranks in the lowest group of 10 states).

To compound this dilemma, Maine ranks 36th in the nation in per capita income and regularly lags the national average by 12%-15%. This gap costs each Mainer $3,500 per year, each Maine household $9,000 per year and the Maine economy about $4.3 billion per year. If Maine increased the percentage of its adult population with a 4-year college degree from 20% to 30% and increased the R&D dollars spent per employed worker from $250 to $1,000, then Maine's per capita income would be raised to the national average

The SPO analyses concluded that the following four things are required for Maine to build a "knowledge-based economy":

1. *Knowledge workers* – innovators who create knowledge or use knowledge to create new products, processes or services;

2. *Knowledge-generating institutions* – research and development divisions of industry, research universities, public and private sector research laboratories, teaching hospitals and others;

3. *Business climate that invites industry to invest in research and development* – good education, fair tax system, access to university expertise, infrastructure, and financial and technical assistance; and

4. *High "quality of place"* -- healthy environments, vital communities, openness to people of different backgrounds and easy access to the outdoors -- that attracts and retains knowledge workers;

The focus of economic development in the "new economy" is shifting from attracting businesses to attracting "talent" -- defined as creating ideas, financing and getting products to market -- because experience indicates that businesses will move to places with talent. Technology and competency in its use are fundamental to this endeavor. The Maine Software Developers Association survey of business needs for personnel with information technology skills found a large gap in the current Maine workforce. The Department of Labor reports that Maine will create 1,000 information technology jobs over the next 10 years, but that the University of Maine currently produces only 50 computer science graduates per year. New sectors of the Maine economy -- such as biotechnology, composites, financial services, marine science, information technology and environmental technology -- all require personnel with critical, computer skills. In our transitioning economy, learning technologies in Maine schools can provide a feeder system and pipeline for these new business sectors and should provide equal access to all regions of the state.

The Task Force also received preliminary findings from a labor market survey that collected data from 17 economic development regions in the State on behalf of the Department of Economic and Community Development (DECD). The data summarized below are part of this economic development, planning and workforce preparation project:

- The labor market survey of households included 4,000 interviews (thus far) regarding worker's computer skills at work;

- 65% of worker's surveyed indicated they use a computer at work, with the highest use reported in urban areas (70%-85%) and the lowest use reported in rural areas (55%-60%);

- Most workers surveyed (50%) reported they rate themselves as having "intermediate" level computer skills, while 7% consider themselves to be advanced users;

- By age groupings, workers in the 18-24 year old range and the 25-34 year old range rate themselves as advanced users;

- Worker's computer skills increase as their level of educational attainment increases; and

- ❖ 1,200 employers surveyed regarding the desired skills they sought in new hires indicated that computer skills are 4th on the list of "hard to find" or "very hard to find" skills.

Based on the economic development and workforce preparation discussions, the important point made to the Task Force was not simply that Maine's graduating students will need to know how to use technology. Rather, that students will have better content knowledge and be better communicators, problem-solvers, workers and collaborators, as a result of using technology. The Task Force concluded that workplace use of technology is becoming widespread, and that the future prosperity of Maine and its citizens is increasingly dependent on the creation and attraction of jobs that require high levels of problem-solving, communication and technological skills that can be achieved, in part, through a K-12 learning technology initiative.

IV. TASK FORCE RECOMMENDATIONS

The Task Force on the Maine Learning Technology Endowment ("Task Force") makes the following recommendations and presents them for the immediate consideration of the Legislature. These recommendations, and the draft legislation presented in **Appendix F**, were approved by a unanimous vote of Task Force members.

State Learning Technology Plan -- Overview

A. Structure and Governance

The Task Force recommends that the proceeds of the Endowment be deployed as provided in an annual learning technology plan developed and administered by the Commissioner of Education. The Commissioner would develop the annual learning technology plan in collaboration with and pursuant to policy priorities established by a twelve (12) member Learning Technology Advisory Board appointed by the Governor, President of the Senate and Speaker of the House.

Advisory Board structure and composition. A policy advisory board with 12 public members would be established with executive and legislative appointees, with diverse membership with expertise in education, business or economic development, technology, finance, library services and/or higher education. The Commissioner should request and receive participation, planning and advisory assistance by MSRS, PUC, and public higher education institutions as appropriate. In collaboration with the Advisory Board, the Commissioner of Education develops a recommended learning technology plan. Although the plan would be reassessed annually, the plan should address long-term strategies for learning technology.

Recommended plan. The Commissioner should present the recommended plan annually to the State Board, then to the Governor, and subsequently to the Legislature. The Governor should include in his biennial or supplemental budget submission, as applicable, an allocation from the Endowment necessary to implement the plan. This process, and the interplay of executive and legislative oversight responsibilities, is intended to be similar to the process currently used for the Recommended Funding Level for General Purpose Aid to Education. The recommended plan and the proposed annual allocations from the Endowment necessary to implement the plan, should be considered in conjunction with the biennial or supplemental budget, as applicable.

Membership. Membership of the Advisory Board would include: 2 public members appointed by the Speaker; 2 public members appointed by the President of the Senate; 4 public members appointed by the Governor; 1 member representing public higher education institutions in the State, appointed by the Governor; 1 member representing the State Board of Education; 1 member representing the Maine State Library; and 1 member representing the Maine Public Utilities Commission. So that there may be continuity of policy development, in making initial appointments to the

Advisory Board the appointing authorities should give consideration to the appointment of members of the Task Force on the Maine Learning Technology Endowment.

Terms. The term of appointment for Advisory Board members should be three (3) years, renewable. Terms of office for the initial appointments should be staggered. Members representing the State Board, State Library, and PUC should serve only so long as they hold office in the respective agency.

- Terms expiring January 1, 2004:
  - 1 appointment by the Speaker
  - 1 appointment by the President
  - 1 appointment by the Governor
  - 1 member representing the Maine State Library

- Terms expiring January 1, 2005:
  - 1 appointment by the Speaker
  - 1 appointment by the President
  - 1 appointment by the Governor
  - 1 appointment by the Governor representing public higher education

- Terms expiring January 1, 2006:
  - 2 appointments by the Governor
  - 1 member representing the State Board
  - 1 member representing the PUC

Process. At the first meeting of each year, the Advisory Board should elect a chair from among the members. The chair may be elected to no more than three consecutive terms.

- The Advisory Board should meet at least three times per year;

- The Advisory Board should annually report to the joint standing committee of the legislature with jurisdiction over education matters;

- The Commissioners of Education and Administrative and Financial Services should provide appropriate staffing assistance to the Advisory Board; and

- The Commissioner of Education should annually provide the Advisory Board with evaluation and outcome data relative to the implementation of the learning technology plan.

Advisory Board duties. The Advisory Board should advise the commissioner on the development of an annual learning technology plan to achieve the goal of transforming Maine into the premier state for utilizing learning technology in

kindergarten to grade 12 education in order to prepare students for a future economy that will rely heavily on technology and innovation.

The plan recommended annually by the commissioner and the Advisory Board should include, but is not limited to, consideration of the following:

- The ongoing structure, governance and oversight of the MLTE fund;
- The current use of technology in Maine classrooms;
- The current readiness of faculty to teach using technology;
- The professional development needed to integrate technology into classroom teaching;
- Assessment of the strategy and goals for improving and equalizing access to and the use of learning technology in all schools;
- A phased plan for implementing the MLTE program;
- Strategies that coordinate the resources and goals of the MLTE with Maine State Library Network and Maine Telecommunications Education Access Fund (State E-rate);
- Strategies that coordinate K-12 learning technology with initiatives and resources of Maine higher education institutions;
- Tracking data and assessing progress in implementing MLTE program goals.

The Commissioner and the Advisory Board should also consider additional issues necessary to the achievement of the goals of the learning technology plan. Such issues may include but are not limited to, recommendations that the State Board of Education consider the implications of learning technology for pre-service teacher preparation and for standards-based teacher certification.

Accountability and coordination. The Task Force believes that vesting operational responsibilities with the Commissioner of Education provides direct executive accountability to the Legislature, assures coordination with existing efforts, and utilizes existing agency resources and staff as much as possible. Although the Task Force discussed other structural organizations, Task Force members concluded that a more "independent" or quasi-independent entity would provide, at best, limited safeguards against redeployment of the Endowment to other purposes and such an entity could ultimately still be dissolved or de-funded. The best argument for future adherence to the intended use of the Endowment is the success of the plan that is developed and funded. A separate entity also raised the specter of insufficient accountability and the possibility of reduced programmatic coordination.

MLTE staffing and support. The administration of the learning technology plan represents a sizable new program and a substantial undertaking. Given the importance of successful implementation of the program and the limited staff resources currently at the Department of Education and the Department of Administrative and Financial Services, the Task Force requests that the Commissioner of Education and the Commissioner of DAFS make a recommendation to the Governor and the Legislature by March 1, 2001, identifying needed positions, not to exceed two positions and one support position, for management and operations. Staffing issues should be addressed during the First Session of the 120th Legislature so that necessary support would be in place for the planning and procurement stage of the program prior to 2002. All administrative costs should be funded from the Endowment and not from the General Fund.

It is our intention that the Advisory Board would be a strong partner with the Commissioner of Education in the development of learning technology policy, assessment of program outcomes, and planning of future components and expansions of the program.

B. Finances and Investment

The Commissioner of Administrative and Financial Services (DAFS) would act as the fiduciary and fiscal agent for the Endowment. Funds should be invested in such manner as to preserve the principal amount appropriated to the Endowment by the State of Maine (currently $50 million), while maximizing returns. The Commissioner would report to the Legislature annually on the status and outlook of the Endowment.

Investment contract. The Commissioner of DAFS may, if prudent, provide for the investment of Endowment capital by entering into and administering an investment contract for the Endowment with an appropriate entity. If the investment principles and period for the Endowment are such that Endowment funds may prudently be invested in the same manner as state retirement funds, the Commissioner may enter into an investment contract with the Board of Trustees of the Maine State Retirement System.

Structuring Endowment distributions. The Commissioner should adopt an investment strategy and structure distributions from the Endowment in such a manner as to fund the required allocations for the learning technology plan, while preserving the principal amount appropriated by the State of Maine. To accomplish this, the Commissioner may enter into lease-purchase or other appropriate financing arrangements where prudent to spread the cost of capital purchases over a period of several years. Conversely, if the Commissioner determines that it is most prudent to do so, the Commissioner may recommend that the Legislature make allocation for larger initial distributions from the Endowment in order to up-front capital purchases, provided that the investment strategy should preserve the principal amount of the Endowment when examined over a five-year period.

Flexibility in investment. In considering appropriate investment strategy, the Task Force notes that the rapidly evolving nature of technology, significant anticipated changes in technology costs, as well as the stated goals for program expansion and the need for the program to respond to evaluation of effectiveness, may counsel that the Commissioner adopt an investment strategy that preserves some degree of short-term flexibility in deployment of proceeds. Such flexibility would enable the program to respond to changes in policy as directed by the Legislature, without incurring significant penalties on the chosen investment vehicles.

The Commissioner of DAFS should collaborate with the Commissioner of Education in order to anticipate the funding needs associated with the long-term strategies of the learning technology plan. The Commissioner of DAFS should periodically report to the Advisory Board on the status of the Endowment and its long-term financial outlook.

The Commissioner of DAFS should provide for appropriate financial reporting and auditing.

Sustainability. The Task Force considered whether it would be appropriate to provide for an accelerated or current expenditure approach to drawing down the balance of the Endowment. Task Force members concluded that technology is a long-term investment for Maine, that the sustainability of the program is ultimately critical to both equity and effectiveness, and that the Endowment should be managed to preserve principal and ensure a future flow of funds.

Fundraising. The $50 million appropriated by the Legislature to the Endowment is essential to achieve the first phase of the plan encompassing grades 7 and 8. Additional funding from third-party sources, both federal and private, is crucial to enable the expansion of the plan to the high school level in subsequent years. At the present time, if other variables remain unchanged, the estimated additional funds needed to address grades 9 though 12 is approximately $15 million. Thus, funds raised from third-party sources must be additive and not a replacement for proceeds from the current Endowment.

The Task Force heard considerable evidence that substantial third-party donations, grants, and other fundraising are feasible. Several foundations have historically provided multimillion-dollar grants for innovative technology integration. The federal government has several sizeable technology grant programs that are discretionary and competitive. Numerous corporate entities have contacted state officials regarding their willingness to provide funding, in-kind contributions, or reduced-pricing opportunities.

The Task Force recommends that the Commissioners of Education and Administrative and Financial Services be charged with responsibility, for the duration of the program, to identify and submit grant and/or fundraising proposals as appropriate in

support of the priorities of the Learning Technology Plan, to such federal, corporate, foundation or other third-party sources as may be appropriate.

In conjunction with the Advisory Board, the Commissioners should develop a plan for fundraising and grant sources that is designed to raise sufficient funds to enable the program to expand to the high school level. The fundraising plan should identify specific sources, timelines, and assessing probability of success. The fundraising plan should be part of the learning technology plan submitted in the Second Regular Session of the 120th Legislature.

In order to preserve the integrity of the educational purposes of the learning technology plan, all fundraising and grant proposals must be consistent with the goals and terms of the learning technology plan. The Commissioners, in conjunction with the Advisory Board, should develop any necessary guidelines for fundraising and grant proposals in order to carry out this requirement.

The Task Force recommends that the Commissioners of Education and Administrative and Financial Services proceed immediately to identify specific potential sources and amounts, governmental and private, of grant and fundraising support for the Learning Technology Plan, and provide such information no later than March 1, 2001 to the joint standing committees on education and cultural affairs and appropriations and financial affairs for their deliberations about this plan.

C. Program

MLTE state learning technology plan. The goal of the MLTE is to ensure a basic level of access to technology, the Internet and training and learning opportunities for all Maine public schools, students and teachers at the middle school and high school levels.

Scope. There are considerable uncertainties in projecting forward the available revenues, technology needs, and associated costs for more than a few years at a time, particularly given the rapidly changing nature and reducing cost scale of computer technology. Thus, the Task Force has focused on articulating the long-range goal for the Endowment, and then defining with greater specificity the foundation components for the first several years of the plan, that are financially sound, technologically feasible, and educationally appropriate based on what is known today. Above all, the Task Force endeavored to recommend an initial concept that would successfully demonstrate the power and potential of learning technology, and guide the planning and deployment of subsequent components.

Local Participation. All school units may participate in the state learning technology plan. Because local policymakers, administrators, educators, and parents should commit time, effort, and oversight to successfully implement the state-funded learning technology program, local school units should submit a simple letter of intent indicating their willingness to participate.

Eligibility. All students educated at public expense should be eligible to participate in the program. Technology equipment or alternative equivalent value would be supplied to the school or school unit in which a student is enrolled. The Commissioner of Education and the Advisory Board should assess the legality, feasibility and affordability, and make recommendations to the Legislature regarding the provision of technology to Maine students attending approved private, nonsectarian schools; attending approved private, sectarian schools; or who are educated at home.

Initial Phase: Middle School Foundation. The initial phase of the recommended program would target all schools, students and teachers at the 7th and 8th grade levels. Based on the available evidence and the educational expertise within the Task Force itself, the Task Force concludes that middle school is an appropriate, critical beginning point for introduction of high concentrations of learning technology, for several reasons: (1) middle school is an important transition period for many students, where it is crucial to use powerful, personalized learning tools to keep students engaged academically; (2) middle school students and teachers are generally receptive and adaptive to collaborative, integrated approaches to teaching and learning; and (3) middle school students would carry technology-based skills into high school, where more varied options for computer access sometimes exist. It is projected that this phase of the project can be implemented -- with reasonable estimates of investment earnings and of project costs – while maintaining the Endowment principal, without any additional grants or fundraising, and be fully sustainable for replacement needs in subsequent years.

Program Expansion: High School. If revenue and cost projections permit, the program should as soon as practicable expand to provide equitable access to technology to all schools, students, and teachers in grades 9 through 12. The Task Force identified three major variables that will determine the feasibility of the second phase: (1) cost estimates, (2) revenue estimates (earnings and fundraising) and (3) the life-span of purchased technology. The Commissioners and the Advisory Board should annually assess the feasibility and recommended strategy for the expansion or enhancement of the program beyond the foundation components and grades.

Start-up and phase-in. The program would commence technology distribution for all 7th grade classrooms in the State, beginning in the first quarter of fiscal year 2002-03. In fiscal year 2003-04, the program would expand to provide technology to all 8th grade classrooms in the State. Distribution may take the form of hardware or, in the case of schools with alternative proposals that meet the desired policy parameters of the Endowment, an alternative equivalent value (AEV) to be used towards the purchase of needed technology or professional development in the integration of teaching and technology.

Plan details. The Task Force developed a State technology plan that addresses the policy implications of providing a basic level of technology access for all of Maine's 7th and 8th grade students. The plan builds from the success of the Maine School and Library Network (MSLN) and leverages strengths developed over the past five years within Maine's

schools. The plan focuses on educational outcomes, and views technology as a means rather than an end in itself. The rate of change in technology means that designing a program around the features of specific computer devices is a severely limiting approach, and can inadvertently build-in obsolescence. More importantly, the Task Force developed a plan to facilitate using technology to learn rather than learning to use technology.

To succeed, the plan must be comprehensive in anticipating the array of components, costs, and supports that accompany computer technology. By ensuring that teacher professional development, internal and external networks, home access, and computer devices are all adequately addressed, the Task Force has created a MLTE plan that goes well beyond a simple proposal to purchase machines.

Coordination, utilization and expansion of existing technology infrastructure. There is an array of existing technology infrastructure serving Maine schools, and several existing sources of financial support that can be deployed to enable and complement the technology components that are supported by the MLTE. Other than the MLTE, principal sources of financial support are the MSLN/MTEAF program administered under the auspices of the Public Utilities Commission, and the federal e-rate program. Without the financial resources of these existing programs, and the coordination and utilization of their resources to expand their existing capacity in a manner that complements and supports the MLTE, the proposed learning technology plan cannot be successfully implemented. The Task Force recommends that other policymakers, including the Public Utilities Commission and the Joint Standing Committee on Utilities and Energy, collaborate with the MLTE Advisory Board and the Joint Standing Committee on Education and Cultural Affairs to ensure that the overall learning technology infrastructure of the state functions and expands in a coordinated fashion.

State Learning Technology Plan -- Components

A. Equitable Access – One-to-One Student-to-Device ratio

The key to the success of the MLTE is achieving a one-to-one student-to-device ratio. A saturation deployment of portable technology would allow for integration with the learning process both within and outside of school.

Student Learning Technology Device & Application Package. The primary component funded from the MLTE is the purchase of computer devices and a basic software package for every student in the designated grade level.

The Maine device. The device envisioned by the Task Force is a computer that is able to run necessary software, including appropriate educational programs, while operated as a stand-alone, non-networked device, but which gains more sophisticated capabilities and storage capacity when connected to the statewide network. This computer device would be capable of accommodating, at a minimum, the basic software package described below. It is important to focus on features and functions, rather than on labels. For the sake of simplicity, the Task Force decided to refer to the computer device to be provided, with these capabilities, as the "Maine device." [Task Force members noted that one current category of device with

such hybrid features is "mid-client," but this label is limiting and has connotations of meaning that we may not intend to apply to the Maine program.] Such a computer is much more cost-effective and more easily maintained than a traditional notebook or "laptop" computer, but much more versatile than a true "thin-client" or "dumb terminal" computer that can operate only while connected to a network. The Maine device combines attributes of both types of device in order to maximize educational utility while minimizing total cost of ownership, particularly costs related to technical support and hardware malfunction. The device would need to be rugged, tamper-resistant, and energy-efficient, yet must retain the ability to access relatively complex educational software.

Portable and wireless. The Maine devices must be both portable and wireless for a number of reasons. The Task Force believes that the true educational potential of computer use will not be realized without the ability to access computers in the school building beyond the classroom, and even at home. Physically, there simply is not enough room on a student's desk to fit a traditional computer; beyond space considerations, the cost of delivering electrical power to each seat within a school would be prohibitive. Similarly, providing individual network drops to all seats would be challenging and would limit student usage to their assigned seating location. Wireless portability is therefore both a cost control issue and an educational benefit.

Home use. Students spend only a limited amount of time in school, but have the opportunity to learn all day long. By utilizing portable Maine devices that can travel home with students, the MLTE helps those who would otherwise be without home access to have the same opportunities to enhance work product and further research subject matter of particular interest as their peers with home access already enjoy. Further, parents may benefit from having the device at home as a way to check a student's progress and interact with teachers via e-mail. Although the Maine devices would have portability to allow home access, home use policies would be determined by each school unit.

School ownership of portable Maine devices. Local school units rather than individual students should be the recipients of the devices and would ensure that the deployment and use of the technology is consistent with the mission and policies of the particular administrative unit. Maine devices would be the property of the schools and each school would be able to adopt use policies that facilitate learning and teaching. Decisions over the method by which devices may be made available for home use would be the responsibility of the school unit.

B. Common Suite of Application Software

Basic applications. The MLTE would provide with each Maine device, at no cost to the local school unit, a basic package of software applications including at a minimum, but not limited to, functionalities that facilitate writing (e.g., word processing), calculation (e.g., spreadsheets) and analysis (e.g., databases) as well as communication tools (e.g., Internet browsing and E-mail). This software would be housed, supported, and upgraded at a central server location for maximum efficiency.

Additional software. Additional tools could be added by local districts utilizing the state network but at local expense, most likely through an Application Service Provider (ASP) model. The ASP model would store software on central servers for efficiency but make the applications available only to users with an appropriate license. An ASP approach would limit local support needs and ensure local control of content and learning styles.

Filtering. This ASP software delivery model would provide appropriate filtering or protective software, that can be activated for specified users at local option to limit access to inappropriate Internet content, allowing each school unit to choose the appropriate level of protection for its students.

C. *Funds for Purchasing Basic Library Research Databases and for Additional Content*

Databases. While the MLTE would be directed primarily towards the provision of hardware, software, and professional development, the Task Force recommends a portion not to exceed $175,000 annually should be dedicated to provide access to basic research and primary content materials, selected by the Commissioner of Education in collaboration with the Maine State Library and made available for K-12 education statewide. These basic resources and primary content material would be available online to every school and library in Maine and would be selected to meet the needs of K-12 students, not just the needs of the middle school students receiving Maine devices.

Additional content. If at a future date, additional resources are available beyond the funds necessary for the provision of learning technology and professional development to all middle schools and high schools, the Commissioner and the Advisory Board may recommend in the annual plan that additional funds or grants be provided for statewide or local educational content, including support for curriculum materials aligned with Maine's *Learning Results*.

D. *Alternative Equivalent Value (AEV) Option Available to Local School Administrative Units If They Meet Standards of the MLTE Program*

A school unit may choose an alternative program design rather than the State-negotiated contract, to meet the policy parameters for one-to-one student and teacher access to computer devices, with appropriate features and functions as described in the MLTE plan. The school unit must make application to the Commissioner of Education for approval of the alternative program and the award of funding from the MLTE for the alternative equivalent value (AEV) in lieu of State-supplied technology and hardware. The Advisory Board should develop guidelines for eligibility for AEV.

The Commissioners, in consultation with the MLTE Advisory Board, should develop set the level of the alternative equivalent value to be payable from the Endowment. In setting the level of equivalency, the Commissioners should take into

account and should not disburse as AEV the fixed costs, overhead, and lost efficiencies of scale in the program that cannot fairly be distributed to an individual school unit.

A school unit may receive alternative equivalent value for devices and for the basic software applications suite provided by the MLTE to participating school units. The creation of an AEV option ensures that schools with the resources or commitment to lead and innovate are supported, not penalized for their efforts. The lessons learned from the programs of these innovative schools benefit all Maine students in the long-term.

E. Concurrent and Simultaneous Professional Development Within MLTE Funds

Background. To maximize its power and potential, learning technology must be truly integrated and embedded in daily teaching and learning. For this to happen, teachers must be adequately equipped and supported to adapt and use the technology. Without a significant commitment to teacher support, the initiative will fall significantly short of our ambitious goals. Intensive, out-of-class training experiences for teachers are ineffective if access to technology in the classroom does not exist for teachers to apply, explore, and experiment with the new technology while working with students. The focus of teacher development must change from teaching teachers about technology, to helping teachers to integrate by improving their teaching using technology as a tool.

Findings. Considerable evidence presented to the Task Force suggested that in order for technology to be integrated into teaching in a truly effective fashion, two things are critical: (1) teachers and students must have personal access to computing technology in the classroom; (2) training and professional development in the use of technology must be delivered to teachers in an integrated, immersed way with ample opportunity for hands on exploration and practice for the teacher-as-learner using the technology with students in the classroom.

Recommendation. The Task Force recommends that MLTE funds be used to equip every teacher at each grade level encompassed in the plan with the same learning technology as their students so that teachers would be assured access in order to obtain optimum use in teaching. The Task Force further recommends that MLTE funds be used to provide a "just-in-time," classroom-based, integration-focused approach to teacher professional development. In addition to a core commitment from the Endowment proceeds, teacher support and development must be a high priority for additional grant-writing and fundraising efforts.

Teacher Device & Application Package. All teachers at each grade level encompassed by the learning technology plan should be provided with access to a Maine device and the accompanying software package, and should have access to the statewide network.

Alternative Equivalent Value for Teacher Devices. Evidence presented to the Task Force indicated that 80% of teachers may currently have access to a computer in the classroom. The adequacy and compatibility of these devices is unknown, but many may

be unsuitable for adaptation. If a school unit determines that some or all of its teachers are already equipped with appropriate, compatible computer devices, or intends to supply teachers with more advanced devices that meet the parameters of the MLTE plan, the school unit may apply to the Commissioner of Education for a grant for that portion of the teacher device allotment as alternative equivalent value (AEV). The grant must be used for teacher support and development, including the provision of additional professional development, integration support, or computer-based classroom applications and content. The Commissioner and the Advisory Board should develop appropriate guidelines for eligibility for teacher AEV.

Teacher Training & Professional Development. The Task Force recommends that the MLTE provide from endowment funds a foundation level of training and integration support for every teacher in each grade level encompassed by the MLTE plan. The initial professional program would include for every teacher 3 days of intense, small-group, classroom-oriented technology training focused on integration. To the extent possible, this training would be provided in classroom settings with opportunities for application, exploration, practice and feedback.

In addition to the initial training opportunities, the MLTE would also offer ongoing integration support to teachers around the State, organized on a regional basis. As local schools develop individuals with strong skills teaching with technology, the need for statewide support may decrease. For the first phase of the learning technology plan (Grades 7 and 8), the regional integration support would be provided by six (6) distinguished educators in learning technology during the first 3 years, and by three (3) technology distinguished educators for the next 2 years.

The use of distinguished educators pursues the philosophy that teachers learn most by active sharing and practice with highly skilled fellow educators. As the program is currently structured, distinguished educators are practitioners in the field who agree to share their expertise on the state-level, usually for a year's time. By contractual arrangement, the distinguished educator remains the employee of a school unit, preserving job rights and benefits, but with compensation reimbursed to the school unit by the State. Thus, the program provides a unique opportunity for Maine's best teachers to work with many schools, while enabling their own school to retain their services in the future.

As additional grade levels are added to the learning technology plan, the Commissioner and the Advisory Board should recommend commensurate increases in the level of support for professional development and integration. The State's distance learning network can be utilized to increase and enhance the provision of training and support.

The Advisory Board and the Commissioner should seek, under the leadership of the State Board of Education and in conjunction with the State's teacher preparation programs, to ensure that standards and opportunities for pre-service teacher training adequately prepare new teachers to understand and use the full potential of learning

technology. If feasible, the Commissioner should seek in the procurement process the option for teacher preparation programs, or their faculty and students, to purchase at their own expense Maine devices at the same purchase price as the State. The Advisory Board and the Commissioner should collaborate in the provision of teacher training and support, where appropriate and desirable, with the State's institutions of higher education, public and private, and with the Maine Public Broadcasting System.

F. Technical Support

Background. Under the deployment model envisioned by the Task Force, technical support would not be an added burden to schools. The goal of the Task Force is to limit any need for local technical support to the extent possible and to allow the current providers of technical support in schools to focus on support for teaching and integration of technology rather than on fixing computers.

Technical support would be made easily accessible and is designed to incur minimal local impact. The Maine devices would be specifically designed to avoid creating significant local hardware and software support needs.

Maintenance and replacement of devices. The Maine devices to be acquired would be under a long-term warranty with an overstock immediately on-hand. If a Maine device malfunctions it can be quickly replaced and simply shipped back to the manufacturer for assessment and/or repair.

Software support. Software support would happen at remote locations under contract with a vendor and be available by dialing a toll free number. The support is targeted at the schools rather than at students. Software upgrades would be delivered using "push" technology, removing the need for local schools to undertake time-consuming installation. With this capability, the centrally-maintained server can automatically update, or "push," the software upgrades to each individual Maine device when the individual logs into the network.

Network support. Network support would continue to be the role of the Maine School and Library Network (MSLN) and would occur in person via the regional "circuit rider" program and over a toll-free (800) line.

a) 80 hours of call-in support per year for a school;

Each school would receive up to 80 hours of call-in technical support through a model very similar to that used under the MSLN program. Support would be available 16 hours per day, 5 days per week, and would be targeted to respond to issues generated by schools and teachers. (Student issues and concerns would be funneled to the help desk via school personnel.)

b) Staffing for server support;

The technical support for the servers that would power much of the deployment would be carried out from central locations to ensure efficiency and equity among all schools. In order to utilize existing capacity and expertise, it is anticipated that BIS and/or UNET at the University of Maine would house, operate, and maintain the central servers. It is projected that UNET would need to add approximately 4 staff as needed contractual capacity to provide this server support function.

G. Internal School Networks

Developing and enhancing internal school access is a key component in ensuring a cost-effective one-to-one student-to-device deployment.

Consistent with the history and mission of the Maine School and Library Network, the Task Force recommends to the advisory board of the MSLN as well as the Commissioners of the Public Utilities Commission that appropriate action be taken so that the MSLN would make funds available for the purchase and installation of wireless hubs by schools sufficient to cover all classrooms used by the 7th and 8th grades.

Wireless networks remove the need for expensive remodeling and rewiring, and allow students greater freedom to move about the school and collaborate where needed. Any wireless network installed must be standards-based with sufficient bandwidth available to allow for optimum usage by students.

a) Use industry standard wireless technology;

   Any wireless deployment must be standards-based rather than a customized solution. While several standards are currently under discussion and development, the eventual deployment should identify a single standard for statewide deployment.

b) Estimated need for wireless hubs;

   It is estimated that an average of 5 wireless hubs would be required per school. The goal in providing coverage will be to ensure quality access from each applicable classroom and other parts of the building frequently used by students such as the library. Some schools may require more or fewer hubs dependent upon school size. The Commissioner and Advisory Board should work with the Public Utilities Commission to develop guidelines for the equitable allocation of wireless hubs, including consideration for school size and student population. Deployments beyond the calculated level would be the responsibility of the local school unit. A school unit may be eligible for E-rate support for extended deployment.

c) Upgrade schools' MSLN link if necessary;

The addition of individual Maine devices that easily access the network over wireless connections may require that the MSLN link to schools be upgraded prior to deployment. The Task Force requests that the MSLN assess the deployment of the MLTE plan and make preparations to upgrades connection to necessary sites.

d) Installation included.

The installation of the wireless hubs would be part of the support requested from the MSLN. Through a professional deployment, the MSLN can ensure that the minimum number of hubs are used to create complete coverage of the school's relevant instructional areas.

H. External Network

The external networks are an important link in ensuring remote file storage, Internet access and access to certain advanced applications. Maine has been a national pioneer in the development of broadband connections to schools and libraries, and was the first state in the nation to provide broadband connections to all of these institutions.

The external network would be the domain of the MSLN and funded from that source. It is likely that certain schools would need greater bandwidth than is being used at present, and the MSLN is designed to meet escalating needs. Currently, the network converges in sites in northern and southern Maine, and it is likely that these sites would continue to be utilized by the eventual provider of storage and servers.

Home network access. All students would be guaranteed adequate educational access to the MSLN for home use via a toll-free home access option. The Commissioner of Education should collaborate with the Advisory Committee to the MSLN and the PUC Commissioners to design and connect the network. The home network access would allow for the completion of assigned Internet, research or collaborative tasks as well as access to a student's stored work product. This access may take the form of a Maine Education Intranet with a defined universe of educationally useful, relevant web access. To the extent feasible and affordable, the home access would be designed to be accessible to homes with an existing commercial Internet Service Providers (ISP). To the extent feasible, the State-provided home access would be designed not to compete with commercial ISPs.

a) Build on MSLN backbone;

Any additional external network development would build on the existing and highly successful MSLN program. The general network infrastructure provides a cost-effective and controlled means of ensuring an equal level of access to each school containing 7th and 8th grade classes. This network is administered by UNET, the University of Maine's computer and networking division. UNET would continue to be a key partner entering this next phase of the MSLN.

b) Toll-free network and Internet access from home;

A key strategy in creating a level of equity between all Maine students and ensuring access to educational opportunities is to ensure that all 7th and 8th grade students have access to the Maine School and Library Network from their homes. Maine has the highest basic telephone penetration rate in the country, which largely assures that students have access to a dial-up line from their home. In addition, a growing number of Maine families have commercial Internet access in their homes already. The MLTE does not seek to displace these connections, rather it seeks to ensure that those students who do not have this level of access available to them at least have adequate educational access to the Internet, research, communication, assignments and stored work over the MSLN. Access to the MSLN can be made available using a number of cost-effective strategies.

c) Filtering to block Internet content that is not age-appropriate;

The network would provide appropriate filtering software that can block students from inappropriate, dangerous, or illicit Internet content. Each local school unit should determine by local policy whether a particular filter would be activated for the students in that unit.

d) Common server(s) for system-wide applications.

To the extent possible, applications would reside on servers accessed over the MSLN from home or school. This ensures that application upgrades can easily be made from a central location and that any software fixes can occur at these central facilities. UNET at the University of Maine is a likely provider of this service.

Security and virus resistance. Security is a key concern in any deployment. This security pertains not only to the individual device, but also to the network as a whole. By selecting devices that are reliant on the network for software and storage capacity, the Task Force has ensured that the devices would be of limited utility if stolen. If someone were to steal a device and log onto the network, it would relatively easy to locate that individual's point of access and either find the individual or deactivate the account. The network itself is subject to security threats, but these threats would face central security measures very similar to those effectively used at this time by state government. While no system is ever entirely secure, this system would be secure to the point that someone would need considerable skills to break into the network. Finally, if a student used an issued device to obtain illegal access that device could be identified and disabled.

I. Costs of Replacement Cycle for Devices, Servers and Other Equipment

In order to cover the total costs of ownership (TCO), and achieve sustainability, the Technology Plan must calculate and cover both initial costs and the expected

replacement cycle for devices, servers, and other equipment. Based on currently available information, the Task Force has estimated the life-span of the Maine devices purchased by the MLTE to be 5 years. Thus, costs for devices are projected to recur every five years for each grade level that is equipped.

This estimated life-span is significantly shorter than the technology replacement cycle in most Maine schools, and given the network-oriented, Maine device approach recommended here, may be a conservative estimate. By using the network to reduce or remove computing and data storage from the Maine device to the extent possible, the device largely serves as a conduit for information from remote servers or from the Internet. With a less robust device needed, the lifespan of the device can be extended. A longer life-span, if it proves feasible, would significantly lower replacement costs and enhance the prospects for expanding the technology plan to additional schools and grade levels.

J. Evaluation Component

The Commissioner of Education, in collaboration with the Advisory Board, should develop criteria for the evaluation of program effectiveness, which should include but not be limited to considerations such as the following:

Are the priority learning outcomes of the curriculum being addressed?

- What contribution is the technology making to the accomplishment of the learning outcomes?
- Are important learning outcomes being addressed?
- Is the application dealing with higher order thinking skills?

Are the learning outcomes themselves enhanced because of the use of the technology?

- Are the technology applications improving the curriculum, either by addressing essential learning outcomes or by using innovative instructional strategies?
- Has the teacher begun to rethink his/her instructional priorities because of technology?
- Is there increased attention to real world reasoning and problem solving skills and processes?
- Is the technology tool being used to accommodate individual differences in learning rate and style and multiple intelligences?

- ❖ Is the technology creating more independent learners?

- ❖ Is the technology providing a challenge to the more able learner?

- ❖ Has the use of the technology enhanced teacher –student and student-student relationships?

Is the focus of the application on the learning outcomes as the ends, with technology as a means?

- ❖ Is teaching about the computer or other technology tool the secondary focus, with primary attention given to the important learning outcomes?

- ❖ Does the teacher reinforce the concept that the technology is an important means but not an end?

Is the technology extending the learning productivity of students and teachers?

- ❖ Are students accomplishing more learning in the same time?

- ❖ Is there an increase in the teacher's productivity? Is the teacher able to bring about student mastery more quickly? Teach difficult concepts more easily?

- ❖ Has the technology application prompted the teacher to expand his/her repertoire of instructional strategies?

- ❖ Does student performance information indicate that the technology contributes to increased achievement of learning outcomes?

- ❖ Are learning outcomes being addressed through some test of student performance?

- ❖ Is there evidence to show that the use of technology contributes to improved mastery of the learning outcomes?

The Advisory Board and the Commissioner should, where appropriate and feasible, collaborate with the higher education institutions in the State regarding the design and implementation of evaluation measures for the MLTE plan.

State Learning Technology Plan -- Cost Estimates and Investment Projections

A. Cost Estimates for Plan Components

Cost estimates are derived based on current, commercially available products and prices. Moderate-to-conservative assumptions are made about bulk, wholesale pricing and small price reductions over time as technology prices change.

Based on a conservatively projected 5-year life-span, the costs would be projected to recur every five years on a replacement cycle.

For Phase I (Grades 7 & 8), cost estimates are based on the following projections:

- 32,500 students
- 2,330 teachers
- 242 school buildings

Maine Device & Software

Cost: Grade 7 Student/Teacher devices & software: $7.75 million

- $7.3 million for students
- $450,000 for teachers

Grade 8 Student/Teacher devices & software: $7.45 million

- $7 million for students
- $450,000 for teachers

Provides: Maine device for every individual student and teacher at grade level
Stand-alone capabilities with enhanced network-based capabilities
Portable and wireless
Software package with common office applications suite, e-mail, browser

Note: Costs indicated represent the full purchase price. These costs may be spread over a period of several years with an appropriate financing option.

Internal and External Network/Servers/Support

Cost: Year 1 (Grade 7):

Federal E-rate	$1.6 million
MSLN/MTEAF	$1.5 million

Year 2 (Grades 7 & 8):	
Federal E-rate	$1.7 million
MSLN/MTEAF	$1.2 million
Years 3+ (Grades 7 & 8)	
Federal E-rate	$1 million
MSLN/MTEAF	$700,000

Provides: Servers
Network support and maintenance
Internal wireless hubs for schools
Toll-free dial-up MSLN access from home
Call-in technical support and help desk
Data pipelines to schools
Regional "circuit-rider" technical support

Note: Costs indicated assume outright purchase price for servers and other hardware. Annual costs for hardware component will vary if appropriate financing is arranged over a period of years.

Teacher Training component

Cost: $375,000 Grade 7 (year 1)
$375,000 Grade 8 (year 2)
$325,000 (year 3)
$175,000 (year 4)
$175,000 (year 5)

Provides: Intensive integration training
Statewide Distinguished Technology Educators for ongoing regional integration support

Content – Research databases

Cost: $175,000/year for library databases available to all Maine schools.

The following table displays a summary of the total cost estimates sorted by category of MLTE plan components and the funding sources for these items. Please note that this table shows annualized costs projected over a 5-year period for the initial phase of implementing the MLTE plan into 7th and 8th grades across the State.

TOTAL COST ESTIMATES BY CATEGORY AND RESOURCE

Grades 7 & 8 Over Five Years (Note: Amounts indicated reflect full cost in year of purchase; actual costs may be expensed over several years with appropriate financing.)

Category	MLTE	MTEAF MSLN	Federal E-rate
Year 1 – Financial Resource Allocation Amount			
Computer Devices & Software	$7.75 million		
Internal & External Networks & Support		$1.5 million	$1.6 million
Teacher Professional Development	$375,000		
Content	$175,000		
TOTAL	$8.3 million		
Year 2 – Financial Resource Allocation Amount			
Computer Devices & Software	$7.45 million		
Internal & External Networks & Support		$1.2 million	$1.7 million
Teacher Professional Development	$375,000		
Content	$175,000		
TOTAL	$8 million		
Year 3 – Financial Resource Allocation Amount			
Computer Devices & Software			
Internal & External Networks & Support		$700,000	$1 million
Teacher Professional Development	$325,000		
Content	$175,000		
TOTAL	$500,000		
Year 4 – Financial Resource Allocation Amount			
Computer Devices & Software			
Internal & External Networks & Support		$700,000	$1 million
Teacher Professional Development	$175,000		
Content	$175,000		
TOTAL	$350,000		
Year 5 – Financial Resource Allocation Amount			
Computer Devices & Software			
Internal & External Networks & Support		$700,000	$1 million
Teacher Professional Development	$175,000		
Content	$175,000		
TOTAL	$350,000		
5 YEAR TOTAL	**$17.5 million**	**$4.8 million**	**$6.3 million**

B. Investment and Cash Flow Projections

The future of markets and investments is impossible to predict with certainty.

In making financial projections, the Task Force goal was to provide a plan that, to a high degree of certainty, fully preserves the principal amount invested by the State of Maine and funds the defined technology into perpetuity. Thus, moderate assumptions about costs were coupled with moderate assumptions about investment returns. The Task Force and staff utilized the expertise of the investment advisor retained by the MSRS, who also possesses experience in Endowment investing.

In order to assure that total costs of ownership – including a replacement life-span for technology -- and the long-term investment impact is analyzed, costs and investment returns were projected over a 10-year period, beginning with program implementation in 2002. [Estimated earnings for the 21 months prior to 7/1/02 were also calculated and added to the Endowment's starting balance.]

Total earnings and ending balances are dependent on a number of variables. These variables include investment time horizons, rates of return, market volatility, the amount of the balance to be invested, and also include the timing of distributions from the fund. Thus, projections were provided based on two options impacting the timing of payouts: (1) a lease-purchase financing arrangement spreading costs over a several year period; (2) a straight purchase in which acquisition costs are fully front-loaded.

Earnings and Cash Flow for Phase I (Grades 7 & 8): Straight Purchase

- Annual earnings range from $3 million to $3.7 million;
- The estimated ending principal balance is approximately $54 million after 10 years.

Earnings and Cash Flow for Phase I (Grades 7 & 8): Lease-Purchase

- Annual earnings range from $3.8 million to $4.1 million, but additional financing costs are incurred; and
- The estimated ending principal balance is approximately $56 million after 10 years.

Earnings and Project Costs Over Ten Years

- Total earnings are projected to be $35 – 40 million over 10 years; and
- Total costs for Phase I (Grades 7-8) projected to be $35 million over 10 years.

Phase II (Grades 9-12)

- The additional cost of each high school grade is estimated to be $15-16 million over 10 years;

- Although the addition of 9^{th}-12^{th} grades cannot be assured within the existing $50 million based on current, moderate-to-conservative assumptions, the Task Force heard testimony that cost estimates are likely to fall, technology life-span is likely longer than estimated, and that there is a high probability of securing substantial additional funds from third-party sources; and

- A change in any one of these variables would significantly improve the financial outlook for Phase II expansion. Additional fundraising and grants from third-party sources would be targeted to support the Phase II expansion to the high school grades.

V. Conclusion

The Task Force on the Maine Learning Technology Endowment intends the proposed State Learning Technology Plan to be visionary, bold and future-oriented. At the same time, the Task Force aims to address the detailed components that are essential to translating any vision into a real, workable, affordable, and successful program for schools, educators, and students. Empowered by technology, our Maine educators can create new learning environments for Maine students that lead to more powerful, varied, and engaging learning and prepare students for a future in higher education or in a workplace that is increasingly saturated with technology. Our hope is that all our students will, just as we have, learn much about technology, but more importantly will use technology to learn much more skills and knowledge, faster, and deeper to give them the literacy to survive and prosper in a technology-rich society and workplace.

APPENDIX A

P.L. 1999, Chapter 731, Part FFF, Sec. FFF-2: Task Force on the Maine Learning Technology Endowment

Task Force on the Maine Learning Technology Endowment
(Authorizing Legislation)

PUBLIC LAWS OF 1999, CHAPTER 731
PART FFF

Sec. FFF-1. 20-A MRSA Pt. 9 is enacted to read:

PART 9
LEARNING TECHNOLOGY
CHAPTER 801
MAINE LEARNING TECHNOLOGY ENDOWMENT

§19101. Establishment of the Maine Learning Technology Endowment; source of funds

The Maine Learning Technology Endowment, referred to in this chapter as the "endowment," is established. The endowment consists of certain funds dedicated by the Legislature and by other private and public sources for the advancement of learning technology in Maine.

§19102. Purpose

1. Generally. The endowment must be used to enable the full integration of appropriate learning technologies into teaching and learning for the State's elementary and secondary students. The endowment must be managed and governed in a manner that provides for the financially sustainable support, use and integration of learning technology in Maine schools as determined by the Legislature.

2. Learning technology plan. The use of the endowment must be based on a state learning technology plan adopted by the Legislature.

§19103. Finances of the endowment

The endowment includes all assets, funds and holdings held in the name of, on behalf of or for the benefit of the endowment. This is a nonlapsing fund the sources of which include all appropriations and allocations by the Legislature to the endowment; money from any other source, whether public or private, designated for deposit into or credited to the endowment; and interest or other income or assets of the endowment.

§19104. Fiduciary roles and responsibilities

The Commissioner of Administrative and Financial Services, referred to in this section as the "commissioner," shall act as fiduciary with respect to the management and administration of the endowment. The commissioner shall ensure that deposits into the

endowment are segregated and separately accounted for as funds held in trust on behalf of the State for the purposes specified in this chapter and for no other purpose.

1. Investment of the endowment. The Board of Trustees of the Maine State Retirement System shall invest the endowment in the same manner and according to the same investment policy and practices by which the board invests the assets of the Maine State Retirement System. The board shall treat the endowment as held in trust on behalf of the State for the purposes specified in this chapter and no other and shall separately account for the endowment as investment assets, attributing to the endowment its proportional share of investment returns and of investment management costs and expenses, including costs and expenses of the retirement system arising because of its investment of the endowment. The commissioner and the board shall develop jointly a memorandum of understanding, setting out their mutual understanding of the investment of the endowment, the related investment accounting and investment return and expense attribution.

2. Audit of the endowment. The commissioner shall ensure adequate audit of the investment management of the endowment and the expenditures of the endowment each state fiscal year within the scope of the annual audit of the Maine State Retirement System or through separate audit as considered appropriate by the Board of Trustees of the Maine State Retirement System. Any separate audit must be reported to the Governor, the Legislature, the commissioner and the State Controller in as timely a manner as possible after the close of each state fiscal year.

3. Use of the endowment. Until otherwise provided by the Legislature, in accordance with a state learning technology plan, the endowment may be used for necessary audit services, legal expenses, investment management fees and services and general administrative expenses related to the management and administration of the endowment.

Sec. FFF-2. Task Force on the Maine Learning Technology Endowment. The Task Force on the Maine Learning Technology Endowment, referred to in this section as the "task force," is established.

1. Task force membership; chair. The task force consists of 16 voting members and one nonvoting member as follows. The members shall select a chair at the first meeting of the task force.

A. The President of the Senate shall appoint 4 members, including at least one public member and at least one member who is not a member of the majority party.

B. The Speaker of the House shall appoint 4 members, including at least one public member and at least one member who is not a member of the majority party.

C. The Governor shall appoint 6 members, including individuals with expertise in education, business and finance and technology.

D. The Commissioner of Education, or the commissioner's designee, is a member.

E. The Commissioner of Administrative and Financial Services, or the commissioner's designee, is a member.

F. The chair of the Public Utilities Commission, or the chair's designee, is a nonvoting member.

2. Appointment of members. All members must be appointed no later than June 1, 2000. The Executive Director of the Legislative Council must be notified by all appointing authorities once the selections have been made. When the appointment of all members has been completed, the chair of the Legislative Council shall call and convene the first meeting of the task force no later than June 30, 2000.

3. Duties. The task force shall consider issues pertaining to and make recommendations to the Legislature on the structure, oversight and operation of the Maine Learning Technology Endowment established in the Maine Revised Statutes, Title 20-A, section 19101 and the implementation of a state learning technology plan. The task force shall create a state learning technology plan to prepare students for a future economy that will rely heavily on technology and innovation. Based on a review of the current condition of technology in the classrooms of the State, the task force shall plan to transform Maine into the premier state for utilizing technology in kindergarten to grade 12 education. The task force shall:

A. Recommend the ongoing structure, governance and oversight of the Maine Learning Technology Endowment;

B. Assess the current use of technology in the classrooms of the State;

C. Assess the current readiness of staff to teach using technology in the classroom and determine the need for professional development in the integration of technology in teaching;

D. Recommend strategy and goals for the integration of technology in the teaching of content areas and in the achievement of the learning results established in the Maine Revised Statutes, Title 20-A, section 6209;

E. Recommend strategy and goals for improving and equalizing access to and use of technology in all school systems across the State, including state-run schools;

F. Recommend a phased plan for the implementation of a state learning technology plan;

G. Recommend strategies that coordinate the resources and goals of the Maine Learning Technology Endowment with the Maine School and Library Network and the telecommunications education access fund established in the Maine Revised Statutes, Title 35-A, section 7104-B, including policies to maximize the capability of all student and teachers to access the Maine School and Library Network or the Internet;

H. Coordinate strategies for kindergarten to grade 12 learning technology with technology initiatives and resources of Maine's public higher education institutions; and

I. Recommend a plan to track and assess progress in the implementation of goals set forth in the state learning technology plan.

The state learning technology plan funded by the Maine Learning Technology Endowment must be designed to take effect no later than the start of the 2002-03 school year.

4. Staffing assistance. The task force may request staffing assistance from the Legislative Council. The task force may also request additional staffing and other assistance, as appropriate, from the Department of Education, the Department of Administrative and Financial Services and other appropriate state agencies and educational institutions.

5. Compensation. The members of the task force who are Legislators are entitled to the legislative per diem, as defined in the Maine Revised Statutes, Title 3, section 2, and reimbursement for necessary expenses incurred for their attendance at authorized meetings of the task force. Other members of the task force who are not otherwise compensated by their employers or other entities that they represent are entitled to receive reimbursement of necessary expenses incurred for their attendance at authorized meetings of the task force.

6. Report. No later than December 15, 2000, the task force shall submit a proposed state learning technology plan, along with its recommendations to the Legislature. The joint standing committee of the Legislature having jurisdiction over education and cultural affairs may report out in the First Regular Session of the 120th Legislature any legislation necessary to implement the recommendations of the task force.

7. Budget. The chair of the task force, with assistance from the task force staff, shall administer the task force's budget. Within 10 days after its first meeting, the task force shall present a work plan and proposed budget to the Legislative Council for approval. The task force may not incur expenses that would result in the task force's exceeding its approved budget. Upon request from the task force, the Executive Director of the Legislative Council shall promptly provide the task force chair and staff with a

status report on the task force's budget, expenditures incurred and paid and available funds.

Sec. FFF-3. Appropriation. The following funds are appropriated from the General Fund to carry out the purposes of this Part.

LEGISLATURE	**2000-01**
Task Force on the Maine Learning Technology Endowment	
Personal Services	$2,310
All Other	$5,400
TOTAL	$7,710

Provides funds for the per diem and expenses of legislative members and the expenses of other eligible members of the Task Force on the Maine Learning Technology Endowment and to print the required report.

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APPENDIX B

Task Force Membership

TASK FORCE ON THE MAINE LEARNING TECHNOLOGY ENDOWMENT
Public Law, Chapter 731, Part FFF
Membership 2000

Appointment(s) by the Governor

Doug DeCamilla
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Robert H. Edwards
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Appointment(s) by the President

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Lebel & Harriman of Maine
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Sen. Carol A. Kontos
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Sen. Sharon Anglin Treat
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Mr. Charles L. Johnson, III, President
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Appointment(s) by the Speaker

Rep. Irvin G. Belanger
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Rep. Richard H. Mailhot
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Neil Rolde
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Ex Officio

Thomas L. Welch
Public Utilities Commission
18 State House Station
Augusta, Maine 04333-0018

Ex Officio, Voting Member

J. Duke Albanese, Commissioner
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Janet Waldron, Commissioner
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Staff

Phillip D. McCarthy, Ed.D., OPLA, 287-1670
Yellow Light Breen, DOE, 287-5112

APPENDIX C

Individuals Providing Testimony: Experts, Practitioners, Resource People and Interested Parties

Individuals Providing Testimony: Experts, Practitioners, Resource People and Interested Parties

Overview of Available Information on Instructional Technology.
Greg Scott, Maine Dept. of Education

The State of Learning Technology and Public Education K-12 in Maine.
Greg Scott, Dept. of Education
Joanne Steneck, Maine Public Utilities Commission

Current and Future Resources Available to Fund the Integration of Learning Technologies in Maine K-12 Public Education.
Commissioner Janet Waldron, DAFS; Greg Scott, DOE and Ed Gomes, DOE

Learning Technology Demonstration.
Jim Moulton, Educational Technology Consultant, SEED

Vision Quest: Future Scenarios for Learning Technology & Education.
Presentation: Seymour Papert and Visionary MIT Colleagues

Professional Development & the Integration of Learning Technology: "The Way Life Should Be"
Panel Discussion: Francis Eberle &Page Keeley, Maine Math & Science Alliance; Kim Quinn, Dept. of Education; Jim Chiavacci, Univ. of Maine; Ralph Granger, Univ. of Maine at Farmington; Lynn Miller, Univ. of Southern Maine

"Guilford Partnership" Budget and Further Analysis of E-rate Program Information & Maine DOE On-line Survey Data from Maine Schools.
Presentation: Edna Comstock, Maine State Library; Yellow Light Breen, Steve Vose & Dennis Kunces, Maine DOE; and Phil McCarthy, Task Force Staff

Follow-up Presentation of Survey Data.
Presenters: Francis Eberle, Maine Mathematic & Science Alliance; Steve Vose, Dennis Kunces and Yellow Breen, Department of Education

National Developments in Learning Technology Policy and the Implications for Maine.
Dr. Dale Mann, Columbia University

Overview of Existing Scenarios for Technology Solutions: Devices, Applications and Network
Presenters: Richard Hinkley, Bureau of Information Services and Jim Doyle, Governor's Office

Maine Technology Plans: State, Regional and Local Exemplars.
Presenters: Greg Scott, Kim Quinn, Steve Vose & Walter Taranko, Department of Education

Presentation of Labor Market Survey Data.
Presenter: Dr. Charles Colgan, Muskie School for Public Policy

Overview of Library Database Licensing
Presenter: Linda Lord, Maine State Library

Examples of Federal and State E-rate Programs.
Presenter: Edna Comstock, Maine State Library

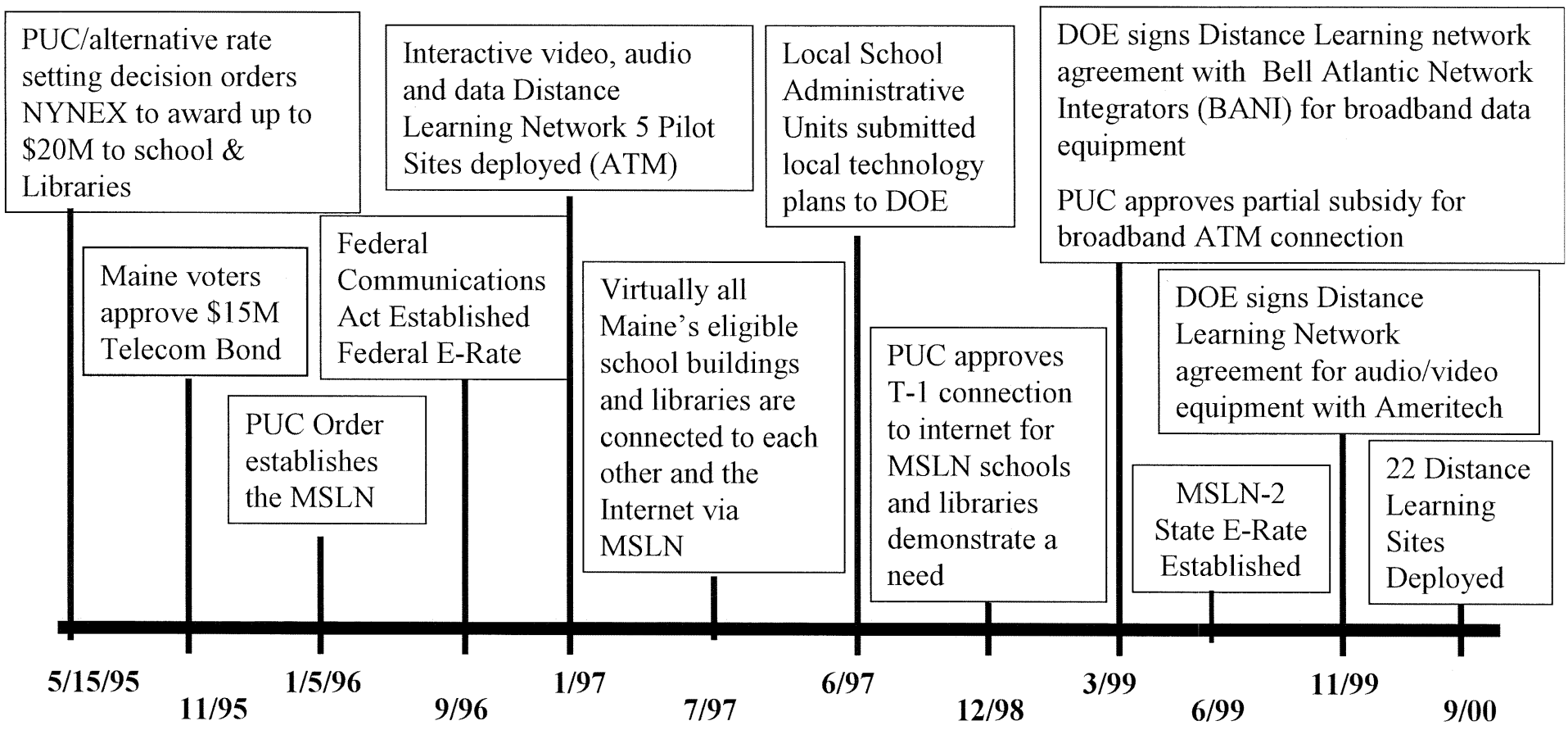
MLTE Investment and Governance Sub-committee Report.
Presenter: Janet Waldron, Dept. of Administrative & Financial Services

Overview of Scenarios for Technology Solutions: Devices, Applications and Network.
Presenters: Jim Doyle, Governor's Office; Richard Hinkley, Bureau of Information Services; and Kim Quinn, Department of Education

APPENDIX D

Chronology of Learning Technology Activity in Maine

Department of Education Chronology of Learning Technology Activity in Maine



APPENDIX E

Maine Public Utilities Commission Background Paper on the Maine School and Libraries Network, the State "E-Rate" and the Federal "E-Rate"

BACKGROUND MAINE SCHOOLS AND LIBRARIES NETWORK
(Excerpted From a Maine Public Utilities Commission Report)[1]

1. Original Plan Approved in January 1996

In May of 1995, at the conclusion of Verizon-Maine's[2] last rate case, the Commission directed Verizon to use up to $4 million per year for five years "to reduce rates and or provide additional services to schools and libraries." During the summer of 1995, a group of interested persons, including representatives of schools, libraries, telecommunication carriers, and state agencies, met to work out a plan for how best to meet this directive. Based on their recommendation, the Commission adopted a plan for connecting all Maine's schools and libraries to the Internet.

Under the plan, schools and libraries were eligible for a free 56 Kbps frame relay connection to the Internet and free Internet service (through a Verizon contract with the University of Maine UNET Technology Services). The Commission appointed an advisory board (see Attachment 1 for list of current members) to oversee the project, referred to as the Maine School and Library Network (MSLN). Schools and libraries desiring a different type of connection could receive the equivalent monetary value of the 56 Kbps connection (i.e., Verizon's out-of-pocket cost to provide the 56 Kbps service over five years) to be applied to a service equivalent or better than a 56 Kbps connection. The 23 independent telephone companies in Maine connected schools and libraries in their service territories, with their expenses reimbursed by Verizon.

Schools and libraries with no computer capable of operating with 56 Kbps received a $2000 computer grant. Sites needing an upgrade for an existing computer received a $600 grant. All participating schools and libraries had an opportunity to send two people to a basic end-user training course. A separate training was offered for technical coordinators. Finally, libraries could obtain up to two regular phone lines at a charge of $12 per month per line (instead of the typical business line charge of around $30 per month). Installations of Internet connections began in May 1996.

2. Legislative Action 1996

In April 1996, the Maine Legislature enacted L.D. 828, An Act to Provide Affordable Access to Information Services in All Communities of the State Through Enhanced Library and School Telecommunications. In the Act, the Legislature established a new telecommunications policy:

> The Legislature further declares and finds that computer-based information services and information networks are important economic and educational resources that should be available to all Maine citizens at

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[1] Reprinted with Permission from the Maine Public Utilities Commission
[2] Formerly known as Bell Atlantic; NYNEX; and New England Telephone Company.

affordable rates. It is the policy of the State that affordable access to those information services that require a computer and rely on the use of the telecommunications network should be made available to all communities of the State without regard to geographic location.

35-A M.R.S.A. § 7101(4). The Act specifically authorized the mechanisms the Commission had adopted in the MSLN project.

3. Eligible Schools and Libraries

The plan approved by the Commission, and the subsequent statutory amendments, defined the schools and libraries eligible to participate in the project. All public schools grades K-12 (currently 728) and all state approved private schools meeting the requirements of 20-A M.R.S.A. §§ 2901, 2951 (90) are "eligible schools." These are private schools approved for tuition, and other private schools approved by the State that meet certain health and minimum education and teacher certification standards. In addition, the Commission, by order issued on March 4, 1997, allowed alternative school programs in buildings separate from already eligible schools to participate (36).

The Commission's original orders made eligible all public libraries (libraries receiving public funding), libraries not receiving public funding but that are open to the public or otherwise function as public libraries, the county law libraries and libraries in public higher education institutions (303). On November 7, 1996, upon the recommendation of the State Librarian and the Advisory Board, additional libraries that meet specific criteria were added. These libraries must be open to the public at no cost at least 20 hours per week; participate in interlibrary loans; and make at least one computer connected to the School and Library Network available to the public. The State Librarian certifies that a library meets these criteria. This category includes museum libraries, private college libraries and other special libraries (24).

4. Implementation of Original Plan 1996 - 1998

By June 1997, virtually all eligible sites were connected (1104). Of these 118 received AEV; 156 libraries and 77 schools received $2000 computer grants; and 31 libraries and 61 schools received $600 computer upgrade grants. By June 1997, 1418 school representatives and 482 library representatives had attended the basic end-user training. An additional 758 representatives attended technical coordinator training. The following year, an additional 2198 representatives received training through workshops, on-site sessions, discussion seminars or consulting support. By the spring of 1998, Verizon estimated that it would spend $9.5 million through June 2000 to operate the program as then currently designed. In the fall of 1997, the Advisory Board conducted a survey of all connected sites (See Attachment 2). Those results began to inform the next phase of the project, as described below.

5. Expansion of Bandwidth and Technical Assistance 1998 - 1999

In the spring of 1998, the Commission solicited input on whether there were additional needs to be addressed because it appeared that the entire $20 million would not be spent by June 2000. Some sites commented about slow speeds and others noted the need for more training. In response, the Commission directed the creation of a "circuit rider service" where three experts visit or consult with individual schools and libraries to diagnose problems related to slow speeds, software problems, and other technical problems.

The Commission also directed the Advisory Board to establish criteria so that sites that were making maximum use of their 56 kbps connection could qualify for a higher speed connection. The Commission approved the Board's proposal in December 1998. Since January 1999, 265 sites have switched to T-1 connections.[3]

6. Federal E-Rate Program

In 1996, Congress created the Universal Service Fund for Schools and Libraries (commonly referred to as the "E-Rate") as part of Public Law 104-104, the Telecommunications Act of 1996, to provide discounts on the cost of telecommunications services and equipment to all public and private schools and libraries.[4] Eligible services range from basic local and long-distance phone services and Internet access services, to the acquisition and installation of equipment to provide network wiring within school and library buildings. Computer hardware and software, staff training, and electrical upgrades are not covered. The program is administered by the Schools and Libraries Division (SLD) of the Universal Service Administrative Company under the direction of the Federal Communications Commission.

On January 30, 1998, the first period for E-Rate applications opened. Eligible schools and libraries may receive discounts on eligible telecommunication services ranging from 20 percent to 90 percent, depending on economic need and location (urban or rural). The level of discount (i.e., schools and libraries pay less than market cost to obtain eligible equipment and services) is based upon the percentage of students eligible

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[3] In April of 1999, the MSLN also began contributing $358 per month for 20 sites receiving internet service via the ATM network. In November 1995, voters passed a $15 million bond issue to fund distance learning via ATM (a synchronous transfer mode). This is a broad band fiber optic networking system that transmits voice, video and data. High schools and the largest libraries may participate in this project.

[4]The background information on the Federal E-Rate in this section comes from a recently issued U.S. Department of Education Report, *E-Rate and the Digital Divide: A Preliminary Analysis from the Integrated Studies of Educational Technology.* It is available at www.ed.gov/offices/OUS/eval/erate_fr.pdf.

for participation in the National School Lunch Program or other federally approved alternative mechanisms contained in the Elementary and Secondary Education Act . For libraries, the discount rate is based on the poverty level of the school district in which they are located. Eligible institutions may participate as part of multiple E-Rate applications. In addition, a school or library can apply for discounts as part of a consortium with other entities within its community (e.g., with other schools, libraries, governmental entities, or health care providers). Applications are prioritized for funding based on the level of discount (higher discounts are given higher priority) and the type of services requested. For example, applications requesting internal connections (i.e., connections to classrooms and workstations) in Year 1 were only funding for applications with discounts from 70-80 percent because of funding shortfalls relative to total E-Rate requests.

The E-Rate application process consists of five steps. Eligible schools and libraries must:

1. prepare a technology plan that meets SLD criteria;

2. submit a "Form 470 Request for Services." This form notifies SLD of the services and/or equipment that are needed and is submitted either in hard copy or by posting it on the SLD web site;

3. collect bids from vendors through a competitive bidding process;

4. submit a "Form 471," describing services ordered; and

5. receive notification from SLD of approved acquisitions

As described above, Maine's schools and library project was a fully operational when the federal E-Rate program began in January 1998. The federal program is designed to provide a discount off a tariffed or contracted rate. Since under MSLN, Verizon provided Internet service and connections for free, there was no rate on which to receive a federal discount. Maine's schools and libraries have primarily used the federal E-Rate to receive discounts on regular telephone service. For 1998 Maine schools and libraries received discounts totaling $3.5 million; for 1999 -- $2.9 million; and for 2000 (as of August 2000) -- $2.994 million.

Most schools and libraries participating in the federal E-Rate have complained about the burdensome application and award process. The process, both as to timing and forms, must be followed precisely or applications are rejected. The processing has been so slow that many sites have to "front" the payment for the service and get reimbursed after the fact. The entire application process must be repeated annually for recurring expenses. The Maine Department of Education has submitted a blanket Form 470 for regular telephone service, but each individual site submits a Form 471.

7. Legislative and Public Utilities Commission Activity 1999 - 2000

In June 1999, the Governor signed into law legislation (effective September 18, 1999) directing the Public Utilities Commission to establish a Telecommunications Education Access Fund (often referred to as the State E-Rate). All carriers offering telecommunications services in the State will contribute to the fund, in an amount not to exceed 0.5% of retail charges, as determined by the Commission. The Fund may be used to provide discounts for telecommunication services, Internet access, internal connections, computers, and training. The assessment for the Fund can begin no earlier than July 1, 2001. At a minimum, 25% of the funds collected are to be used for projects that are "innovative and technologically advanced."

In July 1999, the Commission extended the MSLN project for an additional year, through June 2001, because activity under the new fund will not start until July 1, 2001. Verizon now projects that MSLN will cost a cumulative total of $12.5 million through June 2001.

In August 2000, the Commission completed a rulemaking that describes how it will implement the new State E-Rate.[5] Under the rule, the Advisory Board will recommend to the Commission, based on its assessment of need, the amount to be assessed to carriers, up to the 0.5% of retail charges permitted by the statute. Based on 1999 revenues, 0.5% would equal around $3.2 million. All sites eligible for federal E-Rate must apply for federal discounts before qualifying for the state discount. The rule places a priority on funding state discounts that, when combined with the federal E-Rate discount, will allow sites to receive, at a minimum, the same level of service they are receiving under the MSLN as of June 30, 2001. The Department of Education has issued an RFP to obtain contractors to provide T-1, frame relay and Internet services under a blanket contract. Sites may opt for service under the contract and a blanket federal E-Rate application will be submitted for these sites. Sites choosing other technologies for reaching the Internet or another Internet service provider will submit their own federal applications. A state E-rate subsidy will be available that should allow sites to obtain, at a minimum, their current level of service, at no additional charge. The Advisory Board is currently discussing a possible process for awarding grants for schools and libraries that submit proposals for "innovative and technologically advanced" projects.

8. Summary

The current Maine School and Library Network provides free Internet service, and a connection to the Internet via a 56 Kbps frame relay or T-1 connection, to approximately 1100 Maine schools and libraries. Currently 107 sites have chosen

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[5] As part of that process, the Advisory Board sent an informal survey to schools and libraries over the Internet. Although non-scientific, the results provide an indication of current needs (see results in Attachment 3).

alternative means of obtaining Internet access (primarily via cable systems). The funding for the MSLN has come from Verizon ratepayers and ends in June 2000.

The State E-Rate program will go into effect in July 2001 and could provide up to $3-4 million for telecommunications services, Internet connections, computers and training. Schools and libraries must apply for any available federal discounts before using state E-Rate funds. The Commission has directed that the unspent funds remaining with Verizon after June 2001 will be used to benefit schools and libraries in a manner as yet to be specified.

APPENDIX F

Proposed Legislation to Implement the Recommendations of the Task Force on the Maine Learning Technology Endowment

LR #: n/a
Sponsor: MLTE Task Force
Drafted by: PDM
Date: 1/26/01
File Name: G:\OPLAGEA\GEASTUD\119-2nd\LearnTechEndow\MLTE-Gov-Law-1-13.doc (1/26/01 11:03 AM)

PROPOSED STATUTORY LANGUAGE
for Legislative Review
Note: Underlined text = Proposed Language

CHAPTER 801
MAINE LEARNING TECHNOLOGY ENDOWMENT
(HEADING: PL 1999, c. 731, Pt. FFF, @1 (new))

§19101. Establishment of the Maine Learning Technology Endowment; source of funds

The Maine Learning Technology Endowment, referred to in this chapter as the "endowment," is established. The endowment consists of certain funds dedicated by the Legislature and by other private and public sources for the advancement of kindergarten through grade 12 learning technology in Maine.

§19102. Purpose

1. Generally. The endowment must be used to enable the full integration of appropriate learning technologies into teaching and learning for the State's elementary and secondary school students. The endowment must be managed and governed in a manner that provides for the financially sustainable support, use and integration of learning technology in Maine schools as determined by the Legislature.

2. Learning technology plan. The use of the endowment funds must be based on a ~~state~~ learning technology plan developed annually by the commissioner, with the advice of the advisory board established under section 19109, and ~~adopted~~ endorsed by the Legislature. The annual learning technology plan must be designed to achieve the goals of preparing students for a future economy that will rely heavily on technology and innovation, and transforming Maine into the premier state for utilizing learning technology in kindergarten to grade 12 education.

The plan recommended annually by the commissioner and the Advisory Board shall include, but is not limited to, consideration of the following:

A. The appropriate structure, governance and oversight of the endowment;

B. The current use of learning technology in classrooms in the State;

C. The current readiness of faculty to teach using technology;

D. The professional development needed to integrate technology into classroom teaching;

E. Assessment of the strategy and goals for improving and equalizing access to and the use of learning technology in all schools;

F. A phased plan for implementing the learning technology plan;

G. Strategies that coordinate the resources and goals of the endowment and the learning technology plan with Maine School and Library Network and Maine Telecommunications Education Access Fund (State E-rate);

H. Strategies that coordinate kindergarten to grade 12 education learning technology with initiatives and resources of Maine postsecondary education institutions;

I. Data tracking and assessment of the progress of implementing the goals of the endowment and the learning technology plan.

§19103. Finances of the endowment

1. Endowment assets. The endowment includes all assets, funds and holdings held in the name of, on behalf of or for the benefit of the endowment. This is a non-lapsing fund the sources of which include all appropriations and allocations by the Legislature to the endowment; money from any other source, whether public or private, designated for deposit into or credited to the endowment; and interest or other income or assets of the endowment.

2. Fundraising plan. The commissioner and the Commissioner of Administrative and Financial Services shall be charged with the responsibility, for the duration of the program, to identify and submit grant and fundraising proposals, as appropriate, in support of the priorities of the learning technology plan, to such federal, corporate, foundation or other third-party sources as may be appropriate.

In conjunction with the advisory board established under section 19109, the commissioner and the Commissioner of Administrative and Financial Services shall develop a plan for fundraising and identifying grant sources that is designed to raise sufficient funds to enable the program to expand to the secondary school level. The fundraising plan shall identify specific funding sources, timelines, and an assessment of the probability of success. The fundraising plan shall be part of the learning technology plan submitted in the Second Regular Session of the 120th Legislature.

In order to preserve the integrity of the educational purposes of the learning technology plan, all fundraising and grant proposals must be consistent with the goals and terms of the learning technology plan. The commissioner and the Commissioner of Administrative and Financial Services, in conjunction with the advisory board established under section 19109, shall develop any necessary guidelines for fundraising and grant proposals in order to carry out this requirement.

Maine Public Utilities Commission may serve on the advisory board only so long as they hold office in the respective entity. Terms of the initial appointments shall be staggered as follows:

A. Terms expiring January 1, 2004 include one member appointed by the Speaker, one member appointed by the President of the Senate, one member appointed by the Governor and one member representing the Maine State Library;

B. Terms expiring January 1, 2005, include one member appointed by the Speaker, one member appointed by the President of the Senate, one member appointed by the Governor and one member representing public postsecondary education in the State;

C. Terms expiring January 1, 2006, include two members appointed by the Governor, one member representing the State Board of Education and one member representing the Maine Public Utilities Commission.

6. Expenses. Members of the advisory board must be compensated according to the provisions of Title 5, chapter 379.

7. Appointment. In the case that a member leaves the advisory board, the respective appointing authority shall appoint a new member to serve out the remainder of the term.

8. Staffing assistance. The commissioner and the Commissioner of Administrative and Financial Services shall provide appropriate staff support to the advisory board.

§19110. Powers and duties of advisory board

The powers and duties of the advisory board include the following.

1. Annual learning technology plan. The Advisory Board shall advise the commissioner in developing an annual learning technology plan as described in section 19102, which shall provide the basis for annual allocation of funds by the Legislature from the endowment.

2. Learning technology standards and measurements. To measure the effectiveness of the learning technology plan, the advisory board may establish standards and methods of measuring progress in the levels of academic achievement for students who participate in the learning technology plan. The advisory board may also establish standards and methods of measuring progress in the professional development of teachers who participate in the learning technology program, as well as the impact of the learning technology plan on parents, lifelong learners and the economic impact on

communities across the State. The advisory board may assess the impacts of the learning technology plan according to these standards and measurements.

3. Scope of assessment role. As part of its assessment role, the advisory board may also consider relevant strategic issues necessary to develop, maintain and support the achievement of the goals of the learning technology plan. Such issues may include, but are not limited to collaboration with the State Board of Education regarding the implications of the learning technology plan for pre-service teacher preparation and for standards-based teacher certification in the State; as well as collaboration with other state agencies and state policymakers related to other strategic issues necessary to assure the most cohesive system possible for planning, action and service in providing kindergarten to grade 12 education educational opportunities.

4. Annual report. The advisory board shall report annually to the joint standing committee of the Legislature having jurisdiction over education matters and the joint standing committee of the Legislature having jurisdiction over appropriations and financial matters on the general status of the finances and operations of the endowment and the learning technology plan, including the results of the data tracking and other assessments.