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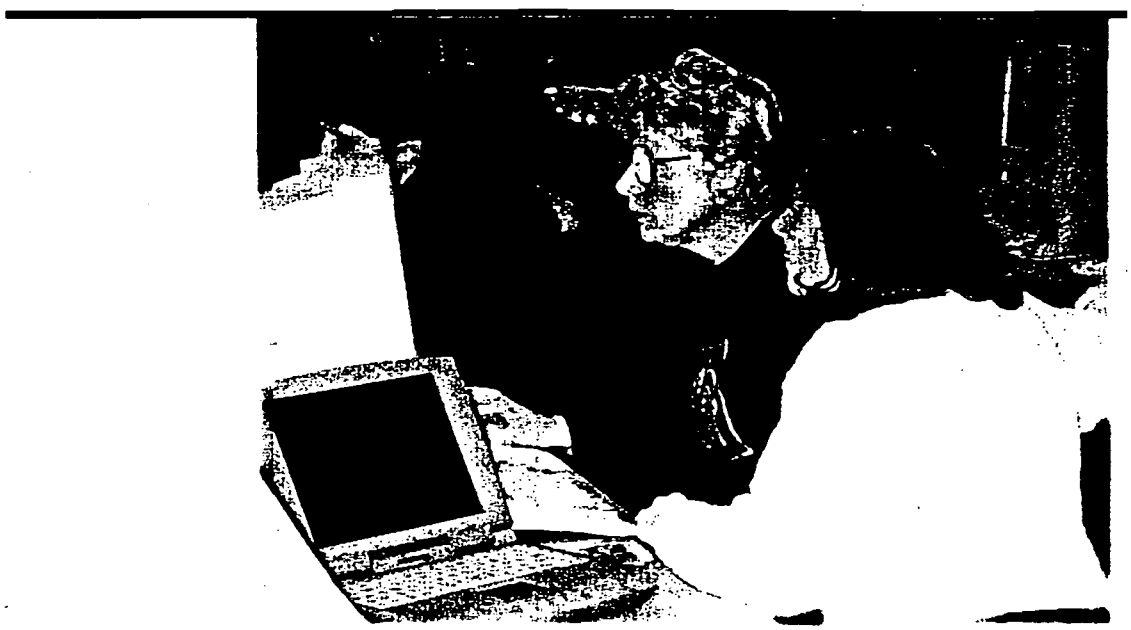
ABSTRACT

"Michigan's State Technology Plan (1998)" includes 21 Recommendations and 14 Belief Statements that focus on incorporating technology into the curriculum, training teachers and other staff members, funding educational technology programs, and establishing technical standards and a telecommunications infrastructure on which educators can rely. In keeping with Recommendation number 21 that the Technology Plan be regularly reviewed and updated, this "Update 2000" contains the original material from the 1998 Plan, with status reports and additional recommendations. Contents include: Position of the State Board of Education; Introduction; History of State Technology Planning; Alignment with Other Initiatives; and Assessment of Michigan's Performance. Belief Statements and Recommendations follow. Recommendations are in these areas: Equity; Technology Integration; Competency Expectations of K-12 Graduates; Training; Technology Budgets and Training; Teacher Competencies; Information Clearinghouse; Technology Staffing Levels; Supplementary Technical Support; Infrastructure Support; Technical Standards; Model Technology Plan; Technology Appropriation; Funding Flexibility; Collaboration; Statewide Purchasing and Licensing; Advocacy; Public Awareness; Administrative Communications; Electronic Learning Community; and State Technology Plan. For each Recommendation, the following are identified: challenge; the Recommendation statement itself; rationale and implementation; resources; success; citations, and Update 2000. The appendices were not changed since the 1998 document, and are therefore not included in this Update. (AEF)



Michigan's State Technology Plan (1998)

UPDATE 2000

Michigan Department of Education
Lansing, Michigan

Michigan's State Technology Plan (1998) — Update 2000 was adopted by the State Superintendent's Educational Technology Advisory Committee (ETAG) on November 6, 2000 and, upon recommendation by State Superintendent Arthur Ellis, accepted by the State of Michigan Board of Education on December 14, 2000.

The format for this document includes the original material from the 1998 plan, with updates included at the end of each section in dark blue.

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Cover photograph: Michigan Department of Education's Educator on Loan for 1998-99, Marilyn Western, assists in a professional development seminar funded by the Technology Literacy Challenge Fund. Photography courtesy of Deb Dunbar, Gratiot-Isabella Intermediate School District.

Executive Summary

In providing its approval to *Michigan's State Technology Plan (1998)*, the State Board of Education reaffirms its support for the role that technology can play in furthering the educational mission and contributing to student achievement. The growth in the use of voice, video and data technologies by schools in Michigan parallels the evolution of state technology plans adopted by the Board and the implementation of recommendations included in those plans by the Michigan Department of Education (MDE). Michigan is fortunate to have so many groups and organizations that firmly believe in the potential for technology to benefit education and the state's diverse student population. The challenges and opportunities that lie ahead, to convert "potential" into reality, will require an unprecedented degree of creative leadership from educators and policymakers at all levels.

Michigan's State Technology Plan (1998) (hereafter referred to as *Tech Plan '98*) includes 21 Recommendations and more than a dozen Belief Statements. These include incorporating technology into the curriculum, training teachers and other staff members, funding educational technology programs, and establishing technical standards and a telecommunications infrastructure on which educators can rely. A fundamental recommendation is the creation of statewide policies that address equity of access to technology-delivered learning resources for all students, regardless of their economic status, place of residence, age, disability, and other factors. Another key proposal calls on MDE and other educational interests to intensify their advocacy of technology in the learning environment.

The preceding state policy document, *Michigan's State Technology Plan (1992-1997)*, was scheduled to be revisited and updated in 1997. The pace of technological innovation in education is rapid, as evidenced by the Internet's increasing power. The state's guiding policy document for the application of technology in education must reflect the many electronic learning tools used by schools today, such as high-speed multimedia computers and interactive video classrooms. Further, it is imperative that Michigan has a state technology plan that is in compliance with requirements of funding initiatives of the federal government.

The State Board of Education acknowledges the instrumental role played by the State Superintendent's Educational Technology Advisory Group (ETAG) in assisting MDE in the preparation of *Tech Plan 98*. Approximately 40 groups and organizations participated in the process and provided support and staff assistance. Membership was composed of public and private sector stakeholders in the application of technology in the educational mission, including public and nonpublic schools, public school academies, colleges and universities, libraries, businesses, plus teachers, school administrators and business officials, media and curriculum specialists, parents and students. It is the Board's intent that ETAG continue to provide advice and expertise in implementation and periodic updates of the plan.

The Board also recognizes the role that technology itself played in the creation of *Tech Plan '98*. It would not have been possible for ETAG and MDE to maintain their ambitious timetable without reliance on a variety of online and video technologies to assist with topical research, public opinion sampling, information dissemination and, ultimately, development of the final document.

Update 2000

In keeping with Recommendation #21 that the state technology plan be regularly reviewed and updated, this document contains status reports and additional recommendations. For each recommendation, an Update 2000 section adds new materials that reflect current conditions and newly identified needs. Previous *Tech Plan '98* material has not been modified outside of these clearly marked update sections. The updates were reviewed by ETAG at a July 2000 meeting and submitted to the State Superintendent for approval in November, 2000.

I. Position of the State Board of Education

Educators in Michigan have a long-standing tradition of supporting the application of technology in the education process. The State Board of Education remains committed to policies and initiatives which further this effort.

A state technology plan must be multidimensional to serve the numerous sectors of the learning community, but it will ultimately be judged according to its impact on students and student achievement. The State Board of Education, in adopting *Tech Plan '98*, identifies the following as the collective purpose of this document:

- To offer a vision regarding the use of technology in education and the manner in which it contributes to providing equitable access to learning opportunities for all students;
- To provide a guide for the utilization of technology in the learning environment to meet each student's needs and abilities and improve achievement and performance of all students;
- To advance existing technology activities and encourage the establishment of complementary state, federal and local initiatives and policies which supportive of technology in education;
- To advocate that all educational institutions in Michigan become actively engaged in the dialogue about, planning for and use of technology to advance their educational missions and better prepare students for life in the 21st century.

Tech Plan '98 is the most recent in a series of policy documents focusing on technology in education that has been adopted by the State Board of Education. The Board's first state technology plan was approved in 1987. It was followed in 1990 by *Education: Where the Next Century Begins*, a document that proposed the creation of a five-year state technology plan. That recommendation was realized two years later when *Michigan's State Technology Plan (1992-1997)* received Board approval.

It is the Board's intent that unlike its predecessor, *Tech Plan '98* should not have an expiration date. It will be reviewed on a recurring basis and amended as needed to retain the relevance and vitality necessary to serve as "a living document."

II. Introduction

Education is about the future. The word itself is derived from the Latin "educere," meaning to lead out from. This implies a constant state of change and renewal. Nowhere is this more visible than in the area of technology, where generations come and go practically overnight, and capabilities only dreamed of five years ago are now commonplace. Children enter a world today in which many of the careers they will pursue do not yet exist.

During the past decade, institutions in every segment of society have made sweeping changes related to their design, function, and operation. Technology was at the forefront of many of these changes. There was often an initial decrease in productivity, with benefits accruing only after technology was completely incorporated. It has usually taken 10-15 years between the time educational research generates an innovation and new teaching practices based on the innovation are implemented. Since the life cycle of many technologies is often less than 5 years, educators are challenged to decrease that lag time considerably. Various surveys show that many schools in Michigan are playing a game of "catch up" in adopting technology. The lack of up-to-date hardware and software, as well as training, technical support and local networking infrastructure, is slowing the widespread implementation of technology in schools. Some schools are unable to make large investments due to ongoing financial constraints.

Nevertheless, schools now have more access to technology than ever before. A growing number of students, teachers, administrators and parents are using powerful tools to conduct research, prepare electronic portfolios, collaborate on projects, simulate complex mathematical equations, engage in discussions with experts, publish work online, develop new communication skills and assume greater responsibility for their own learning and professional development. The use of technology is helping to transform education, replacing a traditional reliance on conventional practices with strategies that help tailor the educational environment to address the needs of each student. Figure 1 contrasts traditional approaches with technology enhanced teaching and learning environments.

The real promise of technology in education lies in its potential to facilitate changes in the nature of teaching and learning. Using technology to restructure schools should not mean automating conventional practices, but instead changing significant aspects of the entire process. Technology opens the door for self-paced, individualized instruction and student-centered learning. It creates opportunities to access worldwide information resources and develop knowledge within new contexts. Technology contributes to the improvement of two-way, school-home communications to better engage parents. It offers the potential to empower historically disadvantaged groups such as students with disabilities, by providing them with greater access to communications and learning tools.

Technology has been called "a road to the world," and now more than ever it offers the opportunity for learning to occur anywhere, at anytime, for anyone. It is forcing educators to rethink what is meant by terms such as "classroom," "school" and "student." It is giving learners of all ages an opportunity to create a future of their own.

Figure 1: The Transformation of Education

Traditional Approach consists of:	*Technology allows more of:*
• Teacher-centered learning	• Student-centered learning
• Mass instruction (one size fits all)	• Mass customization with instruction to fit individual student needs
• One pace applies to all students	• Flexible pacing based on student abilities
• Classroom and school building	• Distributed learning possible from anyplace
• Learning during school hours	• Learning at anytime
• Facts and recitation	• Critical thinking in real-world contexts
• Individual student performance	• Collaboration and dialogue among students and between students and teachers
• Textbooks	• Up-to-date primary information resources
• Parent-teacher meeting each semester	• Parent-teacher communication available daily

III. History of State Technology Planning

Tech Plan '98 draws a portion of its strength from the comparatively recent past. Of a number of technology policy documents, including the *Michigan State Board of Education Technology Plan (1987)* and even earlier calls for a statewide computer network linking educational institutions, two documents approved by the State Board of Education warrant special mention:

- *Education: Where the Next Century Begins (1990)*;
- *Michigan's State Technology Plan (1992-1997).*

Education: Where the Next Century Begins featured 14 Goals, including one that called for the creation of a five-year state technology plan. It also encouraged coordination in four major areas: 1) investments in educational technology; 2) support for the integration of technology-based programs in the curriculum; 3) technical assistance to educational agencies to maximize the successful use of technology; and 4) professional development to upgrade the technological skills of educators. Two years later, *Michigan's State Technology Plan (1992-1997)* was adopted by the State Board of Education. It included 22 Recommendations categorized into five major themes: 1) restructuring schools using technology; 2) developing statewide telecommunications systems for teaching, learning and communication; 3) professional development for the learning community; 4) technology investments for the future; and 5) copyright and fair use implications.

These two documents and the State Board of Education were visionary, as seen by the facts that all the categories and themes remain relevant today, including the conclusion in 1992 that public education was the last major labor-intensive industry to incorporate technology into its day-to-day activities. In particular, *Michigan's State Technology Plan (1992-1997)* provided leadership and guidance to the educational community throughout the state, including the Michigan Department of Education. The Plan's role in heightening awareness of the potential for technology to benefit education and student learning has been noteworthy.

Update 2000

Taking Technology Planning into the New Millennium. When *Tech Plan '98* was passed, it included a final recommendation to create a living document that would continue to reflect the changing face of technology and the ongoing progress being made to achieve the recommendations. As a result of this recommendation, this update has been developed.

The review process of *Tech Plan '98* began in January, 1999. The initial process involved an ETAG sub-committee preparing updated information for each recommendation. Data from the Quality Education Data, Inc. (QED) survey released in August, 1999 and the 1999 School Improvement Superintendent's Survey results released in December, 1999 were used to provide statistical support to antecdoctal information for recommendations as appropriate. Based on the sub-committee recommendations, MDE staff with assistance from an external consultant developed the Update 2000 sections for each of the 21 recommendations. The revised document was submitted to ETAG for comments and approval at their meeting in July 2000, and the revised document was forwarded to the State Superintendent for approval in November, 2000.

With a new National Technology Plan due for release in late 2000, the continuing need for review and updating is increasingly important. Plans for the revision need to be reviewed by the State Superintendent and Michigan Department of Education to ensure the process is participative and comprehensive.

IV. Alignment with Other Initiatives

Technology planning on the federal, state, regional and local levels cannot be conducted by only a small handful of people within a single institution and still be of value. Technology represents a thread to be woven through many other planning and policy initiatives. It can strengthen because of its presence or weaken by its absence. Equally important, educational technology policies at all levels perform best when they are mutually advantageous and supportive.

Significant to *Tech Plan '98* is the *Instructional Technology Across the Curriculum (ITAC)* initiative and the Ad Hoc Referent Committee for Preservice Technology. The latter seeks to supplement existing state standards for entry-level teachers. Further, immediate credibility can be gained if the Plan is consistent with requirements of Michigan's Revised School Code of 1995, in particular the provision that schools have annually-updated school improvement plans, which include a technology component.

The ability to implement some of the recommendations in *Tech Plan '98* is dependent on the successful execution of other state initiatives. One example is the proposed creation of a virtual Michigan Information Network. This would be a close collaboration of a number of state agencies with many non-governmental organizations and providers of telecommunications services. The Plan must complement, and MDE must provide some staff resources to help realize, such a communications network.

Figure 2: The Four Pillars

The *National Plan for Technology in Education*, created by the President and the U.S. Department of Education, addresses four primary goals, known as "the four pillars," on which the federal government's educational technology program is based. Most of the 21 Recommendations in *Tech Plan '98* address issues that correspond with at least one of the four pillars. The recommendations are referenced in brackets beneath each pillar description.

- Training: All teachers in the nation will have the training and support they need to help students learn through computers and the Information Superhighway.
  [Michigan Recommendations 2, 4, 5, 6, 8, 9, 12]
- Hardware: All teachers and students will have modern computers in their classrooms.
  [Michigan Recommendations 12, 13, 14, 19]
- Access and Connectivity: Every classroom will be connected to the Information Superhighway.
  [Michigan Recommendations 1, 7, 10, 11, 12, 13, 14, 15, 20]
- Content Resources: Effective and engaging software and online learning resources will be an integral part of every school curriculum.
  [Michigan Recommendations 1, 2, 4, 6, 7, 12, 14, 16, 20]

The four pillars were important to Michigan's implementation of the Federal Technology Literacy Challenge Fund program in 1997. The Program provided more than $8 million that was distributed to Michigan schools on a competitive grant basis. Expectations of an increased state allocation exist for the next four years. To participate, though, Michigan must have a state technology plan that is approved by the U.S. Department of Education. Similarly, school districts must have state-approved technology plans if they are to benefit from the federal Universal Service Fund (USF) program and its promise of providing schools with discounts of 20 to 90 percent on a variety of telecommunications services, including Internet access and internal wiring.

VI. Assessment of Michigan's Performance

To establish realistic goals, to prepare strategies to achieve them and to devise methods by which accomplishments will be measured demand the existence of base line data for purposes of comparison. While Michigan has witnessed a tremendous growth in the number of educational video networks since 1992—more than a 550 percent increase based on data collected in 1996 for the Michigan Department of Education's *Inventory of Instructional Telecommunications Systems in Michigan*—the state's overall educational technology portrait is far less impressive. According to three organizations, Michigan's performance relative to national figures is rarely above average, only occasionally average, and frequently below average.

For example, Michigan ranks below the national average for schools having local area networks (LANs), based on information available from *Education Week* (November 1997), Market Data Retrieval (1997) and Quality Education Data (1997), and in schools having wide area networks (WANs), according to *Education Week* and Market Data Retrieval. All three report that Michigan is below the national average for schools having Internet access and in satellite technology. Student ratios per specific information appliance or technology tool are generally below average, and *Education Week* indicates that just 10 percent of Michigan's teachers have had at least nine hours of technology training in their career, versus 15 percent nationally. Only in the percentage of schools having cable television access does Michigan exceed the national average, according to all three sources. While greater access to information technology does not guarantee increased student achievement, students in Michigan appear to have less access than those in other states.

Though none of the aforementioned publications and survey organizations prepared state-by-state comparisons of educational technology funding, *Education Week* portrayed Michigan as relying almost entirely on federal support coupled with local district and community resources, while other states have benefited from more active involvement by their legislatures. However, the illustrations do show that those states exhibiting more centralized systems of planning and funding educational technology, accompanied by strong statewide leadership, generally enjoy the greatest amount of progress and forward movement.

A need for Michigan to have a strategy for adequately funding statewide educational technology programs, plus those of local schools, was identified by the U.S. Department of Education in its response to MDE's application to administer the state's portion of the federal Technology Literacy Challenge Fund program in 1997. Among other things, the federal agency said that Michigan's proposal should include not only direct funding, but also complementary approaches such as incentives, along with contributions from businesses, universities, and individuals. Michigan's strategy for funding educational technology in recent years has not been compiled into a single policy approach, but continues to include a variety of components:

- Local school districts in Michigan continue to make substantial commitments of their own. In 1996 and 1997, voters in more than 120 districts approved "qualified" bond issues under the state's School Bond Loan Fund, representing building-level, technology infrastructure investments that exceed $190 million.
- The federal Technology Literacy Challenge Fund distributed more than $8 million to schools in Michigan under a competitive grant program in 1997. A significant increase in the state's annual allocation is anticipated through the year 2000.
- Informal estimates range up to $100 million annually for the potential impact in Michigan of the federal Universal Service Fund (USF) program. USF discounts will be available to schools and libraries for a variety of telecommunications services, plus internal wiring and Internet access.
- The settlement in 1997 of the Durant case between 84 local and intermediate public school districts and the State of Michigan includes a payment of $212 million to those districts, plus

a total investment of more than $600 million over ten years to non-plaintiff districts. Allowable uses of that latter figure include electronic instructional material and software, technology, infrastructure and infrastructure improvements, and training for technology.

- More than $10 million of excess earnings of Ameritech were distributed to two statewide and six regional educational technology programs beginning in 1995, under a program administered by the Michigan Public Service Commission. Ameritech matched that figure with a contribution of its own.

- The Michigan Telecommunications Act introduced a significant degree of competition into the state's telecommunications market in 1992, that firmly expresses the belief that competition will reduce prices for all customers, including schools.

Policymakers and educators in Michigan must assemble and organize the preceding initiatives, along with other efforts, into a comprehensive strategy that will help schools in financially supporting educational technology programs. A first step is to continue gathering information that will evaluate the current status. In 1996, MDE updated its *Inventory of Instructional Telecommunications Systems in Michigan* to help chart the growth of educational networks in the state. In 1997, Michigan participated with Quality Education Data of Denver in the collection of data for a national educational technology survey. The resulting state profile, *ProjectEdTech*, was released in May 1997. MDE will continue its involvement with data-gathering initiatives, and whenever possible introduce surveys that will help establish base line data to assist in measuring the success of recommendations included in *Tech Plan '98*.

Figure 3: Definitions for Technology and Related Terms

References to technology, technology literacy and similar words and phrases can be confusing. There are formal definitions, as well as informal descriptions and usage. There is no shortage of either.

There are two general applications or uses of technology that are particularly relevant to *Tech Plan '98*:

- *Developing the skills necessary to operate various technologies*, such as a computer word processing software program, an Internet web browser, a video camera, a graphing calculator, a personal digital assistant or an alternate input device.

- *Applying the aforementioned skills in a search for knowledge and information or for the completion of specific educational, workplace or personal tasks*, such as multiple-site, collaborative student learning, geographic information systems (GIS) data mapping, or computer-assisted drafting/computer-assisted machining (CAD/CAM).

Technology" has been informally described as any tool invented after a person is born. This concept reinforces the generational aspects of technological innovations such as the automobile, television, microwave oven, or laptop computer. Many children today consider a computer to be little more than another electronic appliance. The term "technology" as used in this Plan encompasses assistive technology, technology education, instructional technology, and industrial technology.

Tech Plan '98 is strengthened to the degree that it can use existing definitions and descriptions, especially those included in current state and federal policy documents. One document in particular, *Instructional Technology Across The Curriculum* (ITAC), was created by the Michigan Department of Education (MDE) and a coalition of educational organizations, and relies heavily on another MDE publication, *Technology Content Standards and Benchmarks* (1996). Key portions of the following definitions are drawn from these sources.

- "Technology" is the systematic application of knowledge, materials, tools and skills to extend human capabilities. A "technology curriculum" integrates the complementary areas of technology education and instructional technology.

- "Technology education" is defined as the study of technology and its effects on individuals, society and civilization. It is a subject or content area, but can include the development of specific technology benchmarks or proficiencies. It helps place student learning into practical and useful real-world contexts.

- "Instructional technology," sometimes identified as "educational technology," is the application of technology to the teaching and learning process. Sample activities include enabling students to complete assignments, access information, and integrate knowledge and skills. The phrase also encompasses the application of technology to administrative functions of an educational institution. It has sometimes been used solely in reference to computers and the Internet, but that is an inappropriately narrow application.

- A "technologically literate learner" is one who explores, evaluates and uses technology to accomplish, independently and cooperatively, real world tasks; develops knowledge, ability and responsibility in the use of resources, processes and systems of technology; acquires, organizes, analyzes and presents information; expands the range and effectiveness of communication skills; solves problems, accomplishes tasks and expresses individual creativity; and applies legal and ethical standards.

- "Industrial technology" is a commonly used phrase that refers to a practical application of technology in the use of materials, tools, and processes in industrial settings. According to MDE's teacher preparation standards, the teaching of industrial technology can include many of the same concepts—critical thinking, problem solving, human dynamics, creativity, and invention—that are stressed when technology-assisted learning occurs in standard classrooms.

References to "infrastructure" in *Tech Plan '98* are defined according to common understanding. "Technology infrastructure" refers to, among other things, cabling and wiring, computers and software programs, satellite transmission and reception facilities, and switching equipment necessary for the operation of telecommunications networks and instructional programs. "Human infrastructure" generally means teachers, media specialists, administrators, students, and others needed to implement and sustain an educational technology program.

A definition of a "technology program" is, to a great extent, situational, to be determined by individual educational institutions. Technology programs frequently incorporate technology planning, administration, training, support and funding, plus the actual application of technology in the learning environment.

Figure 4: Educational Outcomes Derived From Technology

More and more research on educational outcomes is reporting that technology benefits student learning. Empirical data reinforces beliefs held by many teachers and other educators that technology, when properly employed, enhances educational horizons and student performance.

At least three publications have attempted to summarize existing research on the impact of technology on education:

- *Computers and Classrooms: The Status of Technology in U.S. Schools* (1997), Educational Testing Service.

- *Report on the Effectiveness of Technology in Schools* (1995-1996), Software Publishers Association.

- *The ACOT Research Portfolio (1994)*, Student Engagement (Report #21), Apple Classrooms of Tomorrow.

Studies highlighted in each report show that student attitudes toward learning can be bolstered when technology is used in the learning environment. This attitude helps improve student performance and teacher satisfaction. However, carefully designed assessments that present conclusive findings are far outnumbered by claims that technology benefits education.

Most of the immediately identifiable research is national in scope. It does not focus on the impact of technology on students and teachers in Michigan. Educators at local, regional and state levels should be watchful for opportunities to incorporate outcome measurements in their technology programs. Such research would nicely complement anecdotal evidence that is comparatively commonplace.

Belief Statements

In adopting the following belief statements related to the use of technology in education, the State Board of Education recognizes the work of the State Superintendent's Educational Technology Advisory Group (ETAG) and the many challenges that it faced. As members of ETAG proposed and discussed possible recommendations related to the application of technology in the learning environment, it became apparent that a significant number of those proposals serve a more fundamental purpose than does an actual recommendation. These concepts came to be called "Belief Statements," upon which many of the recommendations are based.

- Each school district should establish policies that encourage and support the carefully planned use of technology to increase learning opportunities for students, faculty, administrators, support personnel and community members, and to integrate technology into the curriculum to enrich and expand the learning environment.
- Instructional and administrative applications of technology must drive decisions related to the acquisition of new technology and subsequent activities that provide staff training and professional development in the use of technology.
- Technology plans are not stand-alone documents; technology planning, both for curriculum integration and physical plant upgrades, must be undertaken in coordination with school improvement plans and school reform initiatives.
- Electronic access must be provided to educational resources during times of the day, week and year when school is not in session, since student learning is not an exercise restricted to the traditional school day and the standard classroom.
- Schools must strive to remove all identifiable gender, racial, cultural, disability or similarly based barriers in providing student, teacher and staff access to, and support for, participation in technology-based learning environments.
- All school districts should establish a process and written guidelines to provide consistency in the delivery of assistive technology services and devices to individuals with disabilities, in accordance with the Individuals with Disabilities Education Act of 1997 (IDEA).
- Students should have opportunities to use a wide variety of technologies, including multimedia computers and graphing calculators, plus peripherals such as videocassette players, scanners and digital cameras, in grade- or age-appropriate ways to research and complete learning assignments, and to create, present, display and publish their learning and academic performance.
- School districts have an obligation to develop and disseminate policies to help ensure that students, parents, teachers and staff are aware of the potential hazards related to the use of information technology tools; possible hazards encompass not only health and safety issues such as eyestrain and carpel tunnel syndrome, but also those related to student access to inappropriate content resources.
- There is a general, but not rigid progression of successively more sophisticated innovations that help characterize schools and school districts as technologically capable, to benefit students by improving both the learning environment and school-home communications. Each of the following innovations has implications for the training of teachers, staff, students, and parents.

    a) Voice mail for each school and teacher;
    b) Local Internet access for schools and communities;
    c) Direct dedicated Internet access in each school;
    d) Email with school and have access for each school employee;

e) Classrooms, administrative offices, counseling center and library media center connected to local and/or wide area networks (LANs/WANs) to access shared educational resources and increased operational efficiencies;
f) A web page for publication of each school's curriculum and other information;
g) Each school having a web page for the dissemination of building-specific information;
h) Multi-band satellite reception; and
i) Interactive video.

- An integrated telecommunications network that is widely and easily accessible by educational institutions throughout the state requires the adoption of technical standards.
- Educators should seek to establish community partnerships and collaborative endeavors to successfully implement technology solutions, especially in sharing with neighboring educational institutions, libraries, nonprofit organizations, private businesses and government agencies.
- Intermediate school districts and/or regional educational media centers are appropriate agencies to assist the Michigan Department of Education in servicing and supporting local districts in planning and implementing technology programs.
- The Michigan Department of Education must strengthen its efforts in the use of state-of-the-art technologies to deliver services to Michigan's educational community.
- States possessing creative leadership, especially champions for the instructional and administrative applications of technology, have the best chance to achieve significant progress in the funding and use of new technologies to enhance student learning.

Recommendations

The State Board of Education adopts the following 21 Recommendations with the understanding that they are essential and significant steps necessary to advance the application of technology in the learning environment and provide substantial benefit to students throughout Michigan. The progression of Recommendations is thematic, and not necessarily subject to prioritization.

Page	Recommendation
p. 17	**1. Equity**. The State Board of Education (SBE), working in conjunction with the Governor's Office, the Michigan Legislature and broad educational interests in the state, should examine issues regarding access to technology-delivered learning opportunities and resources for all students, then develop and support policies which promote and improve equity.
p. 19	**2. Technology Integration**. The core curriculum of each school should address the use of technology as an integral part of student learning in each content area, including specific technology knowledge and skills needed by students. Technology should be addressed in a school assessment plan to evaluate learning about technology and the use of technology to enhance learning.
p. 21	**3. Competency Expectations of K-12 Graduates**. Schools should partner with businesses, community colleges, universities and community organizations to keep the local school community, including teachers and students, aware of the specific technology skills graduates of the K-12 system must have to successfully compete in the job market or to perform in post-secondary educational environments.
p. 23	**4. Training**. Ongoing training opportunities that build the general level of technology expertise of educators throughout Michigan must be significantly expanded.
p. 26	**5. Technology Budgets and Training**. Each school district should dedicate, on a recurring basis, a specific and significant portion of its technology budget for ongoing staff training to assist with the effective and efficient use of instructional technology.
p. 28	**6. Teacher Competencies**. The State Board of Education and leading educational organizations in Michigan must reiterate the importance of new teachers having the ability to use information technologies to enhance teaching and learning.
p. 30	**7. Information Clearinghouse**. The Michigan Department of Education (MDE) should work with local and intermediate school districts (ISDs), regional educational media centers (REMCs), colleges and universities, libraries and educational organizations to create an electronic, statewide clearinghouse intended for the discovery and exchange of "best practices" in technology-centered learning, teaching and educational administration.
p. 32	**8. Technology Staffing Levels**. The Michigan Department of Education (MDE) should work in collaboration with local and intermediate school districts (ISDs), regional educational media centers (REMCs), professional educational organizations and accrediting agencies to recommend voluntary professional and technical staffing guidelines needed to maintain effective educational technology programs in schools and school districts, and in regional K-12 service agencies such as ISDs and REMCs.
p. 34	**9. Supplementary Technical Support**. School districts should identify and utilize individuals in their local and school communities who have expertise in the use of appropriate technologies and the ability to work with teachers, staff, administrators, parents and students to increase the efficiency and effectiveness with which technology is applied in the learning environment.
p. 36	**10. Infrastructure Support**. The Michigan Department of Education (MDE) will work cooperatively with state agencies, educational organizations and others to assist in the establishment of a broad-based user group which will address issues related to and formulate strategies to deal with: 1) coordination among local and regional initiatives to build statewide networking capability; 2) equitable access to and affordable costs for high-quality telecommunications services throughout Michigan; 3) technical standards and network operating protocols; 4) support and technical assistance to ensure quality statewide network operations; and

5) financial resources and purchasing programs to benefit educational technology initiatives.

p. 38 **11. Technical Standards.** The Michigan Department of Education (MDE) will work cooperatively with other state agencies and interested organizations to identify and disseminate communications standards for voice, video and data networks, plus facilities renovation and construction standards with optimal specifications for the design of technology-rich learning environments.

p. 39 **12. Model Technology Plan.** The Michigan Department of Education (MDE) will establish a model technology plan or identify an existing model plan, including elements necessary for an effective planning process and ease of incorporation into school improvement plans, to serve as a guide and to accelerate the preparation of quality planning documents by local school districts.

p. 41 **13. Technology Appropriation.** The Michigan Legislature should provide an annual appropriation of funds in the state's School Aid Act specifically for the purpose of implementing technology-assisted learning programs, with districts that receive funds being subject to three basic stipulations. Districts must: 1) have a technology plan that is in compliance with state and federal requirements; 2) supply a matching dollar value from local resources; and 3) demonstrate that real savings gained from participation in the federal Universal Service Fund (USF) program have been reinvested in additional technology, technology upgrades or training, or related expenditures.

p. 43 **14. Funding Flexibility.** Educational interests should work with state and local policymakers to propose and seek approval of legislation that would amend the state's School Code to allow for more flexibility in spending building and site sinking funds, as well as bond funds, for technology-related expenditures.

p. 44 **15. Collaboration.** Educational institutions should make every effort to maximize the funding support and assistance available from public and private sources by establishing collaborative arrangements with other schools, school districts, colleges, universities, libraries and similar entities to aggregate demand for technology products and services, and where real savings result from participation in initiatives such as the Universal Service Fund (USF) program, these dollars should be designated for additional technology-related investments.

p. 46 **16. Statewide Purchasing and Licensing.** The Michigan Department of Education (MDE) should work in conjunction with intermediate school districts (ISDs), regional educational media centers (REMCs) and other educational organizations to support and expand existing statewide purchasing, licensing and evaluation programs for items such as full-text online data bases, educational software and instructional video programs, and to identify similar resources in the state's library community that may be available to schools at little or no charge.

p. 48 **17. Advocacy.** The Michigan Department of Education (MDE) must step forward to collaborate with—and when necessary marshal and aggregate the energies and resources of—other state agencies, state policymakers, educational organizations and institutions, libraries and businesses to increase public awareness and promote the appropriate use of technology in the learning community.

p. 49 **18. Public Awareness.** Schools must expand support for technology-rich learning environments by creating opportunities that promote awareness of, and increase knowledge about, educational technologies currently being used or to be used by students within their communities.

p. 51 **19. Administrative Communications.** Schools, school districts, the Michigan Department of Education (MDE) and other educational institutions should use technology to enhance communications between teachers, administrators, parents and students, to foster administrative efficiencies and strengthen bonds within the educational community and between schools, parents and the general public.

p. 53 **20. Electronic Learning Community.** A content-based, virtual educational network should be established that incorporates instructional and administrative functions in a statewide electronic learning community that is accessible by all schools in Michigan.

p. 54 **21. State Technology Plan.** Tech Plan '98 must serve as "a living document" to be reviewed, supplemented and assessed, at minimum, on an annual basis by the State Superintendent's Educational Technology Advisory Group (ETAG), with new policy proposals and proposed modifications of existing policies forwarded to the State Board of Education for consideration.

Recommendation 1: Equity

The State Board of Education (SBE), working in conjunction with the Governor's Office, the Michigan Legislature and broad educational interests in the state, should examine issues regarding access to technology-delivered learning opportunities and resources for all students, then develop and support policies which promote and improve equity.

Challenge: Technology is having a profound effect on education, however, schools throughout Michigan vary widely in the benefits they experience, but also on how receptive each community is to change. As accessibility to educational resources skyrockets through the use of technology, it is critical that all students in Michigan have an equal opportunity to participate in technology-assisted learning. Otherwise, Michigan risks failure to serve learners at greatest risk: such as ones with disabilities, for whom English is not their native language scoring poorly on standardized tests, from low socio-economic backgrounds, and living in remote areas that lack access to a full spectrum of curriculum choices and informational resources.

Rationale and Implementation: The development and support of state educational policy is a function of the State Board of Education and the Michigan Department of Education (MDE). The recommendation is dependent on having support from policymakers at the highest levels of state government. It is also imperative that support be offered at the regional and local levels. Research conducted in the process of creating policies related to equity of opportunity will help identify an overall dollar figure needed to implement technology solutions for Michigan schools. It is important that the settlement in the Durant case be evaluated regarding the impact it may have on providing greater equity in technology-based learning opportunities for students.

Resources: The development of policies providing equitable access to technology to benefit student learning would require minimal financial resources. However, the actual implementation of such policies by schools in Michigan will involve a significant investment in technology.

Success: State policies should be adopted by December 31, 1999 that recommend schools insure the equitable access to technology learning tools to all students.

Update 2000

Current Status: Moderate progress has been made to promote and improve equity with regard to educational technology opportunities for Michigan's students.

- USF (E-Rate) Program: Designed to provided discounts for various telecommunications related expenditures, this federal program provides greater assistance to districts that serve larger numbers of lower socio-economic populations. Michigan school districts and libraries have realized discounts totaling approximately $66 million in 1998-99 and $77 million in 1999-2000, and another $55.7 million in 2000 through Wave 25 funding. A newly released federal study from the Benton Foundation on the E-rate program showed its role in assisting urban areas, profiling four cities including Detroit as examples of success *(The E-rate in America: A tale of four cities*, 2000)

- Durant Case Settlement: Approximately $245 million has been paid to all public school districts since November 1998 as a result of the Durant Case settlement. These funds could be used to support technology related issues. No specific expenditure data is available. However, anecdotal information suggests that a sizeable number of Michigan school districts are using a portion of these funds for some type of technology related investments. In a survey of 226 randomly selected district superintendents undertaken by IDEA Consultants, Inc. in 1999 for MDE, 56% indicated their districts had used Durant funds for technology purchases.

- The Technology Literacy Challenge Fund (TLCF) grant program provided funds for districts with little or no access to technology resources. In Cycles 2 & 3 approximately $17 million were allocated to local and intermediate school districts and public school academies. In addition, one statewide project, "Academy for 21st Century Schools (ACT)," provided a focus on unaccredited schools in Cycle 2 and broadened support to other low-income schools in Cycle 3.

- The Michigan Information Network (MIN) is preparing a statewide application for the USF program under which all districts may receive funds as a way to ease application procedures. This statewide funding model is expected to help districts with limited resources that were previously unable to accommodate the complex application process to be able to utilize this program in 2001.

- The Michigan Virtual High School began its program of online advanced placement courses in 2000-2001 targeted at districts that do not have the facilities or resources to offer such courses locally. The MVHS is committed to serving a wide range of Michigan students including students with learning disabilities and at-risk pupils and students who can benefit from high-quality online alternative educational environments.

Next Steps: The following actions are recommended:

- Encourage school districts to take advantage of USF discounts and require schools requesting connectivity funding under TLCF to reference how their district is leveraging USF discounts.

- Ensure that school districts are aware of the statewide USF program under MIN so additional districts will able to participate in this federal program.

- MDE should ensure that TLCF grant dollars are targeted to meet needs of low-tech and mid-tech districts to improve equity across the state.

- MDE should provide technical assistance to low-tech and mid-tech districts to help them develop strategies to improve the level of equitable access.

Recommendation 2: Technology Integration

The core curriculum of each school should address the use of technology as an integral part of student learning in each content area, including specific technology knowledge and skills needed by students. Technology should be addressed in a school assessment plan to evaluate learning about technology and the use of technology to enhance learning.

Challenge: The practice and assessment of technology-assisted teaching is often limited by a lack of student competency with technology-based tools. Without grade-specific objectives for student competencies and practical methods of measuring those competencies, educators have no means of evaluating the effectiveness of instructional technology. Even when educators have established student technology competencies, they may not include authentic performance expectations.

Rationale and Implementation: Over the past several years, Michigan educators have developed content standards and benchmarks found in the document, *Working Draft Content Standards and Benchmarks* (1996). It gives guidance to Michigan schools regarding what all students need to know and accomplish in technology and in each content area. To assist this effort, the document, *Instructional Technologies Across the Curriculum* (ITAC), is being finalized by the Michigan Department of Education (MDE) and the special task force of educational groups. It addresses the use of technology in each content area, at each level of schooling. Further, it specifies the skills needed for students to use technology, and to help guide the application of technology skills in instructional activities in the core academic content areas. MDE and leading educational groups in Michigan must work together to disseminate state recommendations. State and local guidelines should be reviewed regularly and amended as needed to keep current with evolving technology and educational practices.

Resources: MDE will finalize and, assisted by state educational organizations, disseminate the ITAC toolkit by October 1, 1998. Primary distribution will be via MDE's web pages (MDEnet), with supplementary efforts to ensure that the document reaches school administrators throughout the state. At the regional and local levels, substantial time commitments are needed from school and district staffs, along with parents, library media specialists and business leaders for the preparation, adoption and implementation of technology guidelines in local curricula.

Success: The initial step in determining the success of this recommendation is the finalization of the ITAC toolkit by MDE, and the subsequent distribution of these guidelines to educators. Long-term success will be measured by the number of schools and school districts using the ITAC toolkit in the development and use of technology across their own curriculum.

Update 2000

Current Status: Progress on this recommendation has been sporadic. The draft content standards have been formally adopted as the *Michigan Curriculum Framework (MCF)*, which includes specific strands and benchmarks for Technology Education. ISDs and local districts have used the MCF to develop school curricula which integrates technology into the core content areas. Work on these projects has been assisted by TLCF and Goals 2000 grants to local districts. Many projects are using *Instructional Technologies Across the Curriculum* (ITAC), developed under the direction of MDE to accompany the *Michigan Curriculum Framework.*

MDE created the Technology-Using Educator On-Loan Program through the TLCF grant program. For the 1998-1999 school year the Educator On-Loan, Marilyn Western, traveled across the state working with district staff members on strategies for integrating technology into the curriculum. The range of inservice ranged from the one-computer classroom to lab settings. In the 1999-2000 school year, two Educators On-Loan, Jane Frank and Jody Whitmer, expanded the

direct support to teachers. Beginning in Fall 2000, Becky Skutt is continuing work with classrooms around the state.

For the TLCF Cycle 3 program, approximately $2.5 million was awarded in the 1999-2000 school year to eight statewide projects. Six of these projects were devoted primarily for professional development targeted for integration of technology into the curriculum.

- One TLCF statewide project focused on developing "Best Practices in Using Technology" as an educational tool with distribution of a CD-ROM across the state containing model lessons. Training was also offered to local districts on using this tool to develop lesson plans which integrate technology.
- Another TLCF statewide project, the "Michigan Teacher Network" provides a clearinghouse of core content curriculum materials. These Internet resources are linked to the *Michigan Curriculum Framework* and focus on technology integration for teachers.

At the local level, technology integration was a major component of TLCF projects. In Cycle 2, 57% of districts averaged 20% of their awards towards curriculum integration. In Cycle 3, this increased to 60% including integration activities with an average of 29% of their awards.

Funding for four new centers under the Michigan Technology Improvement Program (MTIP) has been allocated through the TLCF program which includes program areas related to identification of research-based best practice models and dissemination of results in late 2000.

Next Steps: Recommended actions include the following:

- MDE should review and revise the ITAC document in light of the new National Education Technology Standards for Students published by the International Society for Technology in Education in 1999.
- MDE as well as local and intermediate school districts should continue to support the identification and selection of "best practices" in technology integration.
- MDE, in cooperation with ISDs and local districts, should develop a professional judgment evaluation rubric for technology integration programs.
- Secure state funding so that State initiatives in the area of teacher competencies, student competencies, and curriculum integration can be achieved.
- MDE should coordinate curriculum projects focusing on MCF to integrate technology within the core academic disciplines and use technology in implementation and dissemination efforts.

Citations:

Michigan Curriculum Framework
http://cdp.mde.state.mi.us/MCF/default.html
Instructional Technology Across The Curriculum (ITAC)—K-12 Instructional Technology Use
http://cdp.mde.state.mi.us/Technology/ITAC/default.html
Michigan Teacher Network
http://mtn.merit.edu
GLEN Best Practices
http://glen.cc/

Recommendation 3: Competency Expectations of K-12 Graduates

Schools should partner with businesses, community colleges, universities and community organizations to keep the local school community, including teachers and students, aware of the specific technology skills graduates of the K-12 system must have to successfully compete in the job market or to perform in post-secondary educational environments.

Challenge: Not all teachers and learners have an awareness of how technology is used in everyday life and the workplace, nor have they had experience with it, but they should. Also, teachers and learners should know what higher education expects its students to be able to do with technology-based learning.

Rationale and Implementation: Businesses, community colleges, universities and community organizations can all work to establish partnerships with schools, but schools should not wait for others to take the initiative. There should be communication links between schools and higher education institutions. The continued support of initiatives through the Career Preparation System (including Career and Technical Education, Tech Prep and School-To-Work programs) would be beneficial. In partnerships with businesses educators, students and parents could visit the workplace to view practical applications of technologies. Students could have technology-based work experiences and opportunities to develop technology-related skills. Also, internships can place teachers with local technology-based businesses during summer months. In communities where opportunities are limited or nonexistent, electronic partnerships with distant companies can be explored.

Resources: Staffing and funding implications are strongest at the local level. Programs that create opportunities for students to learn in the workplace, as well as opportunities for businesses to contribute to the learning experience, may need to be supplemented. Some schools may lack computer equipment and software needed to access regional and state work-based education and employment opportunity data bases. Schools must also provide staff opportunities to interact with higher education institutions.

Success: Measuring the success of this recommendation will take two forms. First, there should be an increase in the number of school partnerships involving businesses, community colleges, universities, and community organizations. Second, the number of students participating in these partnerships will increase. The number of Michigan schools establishing local partnerships should be included in an annual survey of Michigan schools, such as the one conducted by Quality Education Data (QED) and the Michigan Department of Education (MDE) in 1997. Some data may also be collected by the Michigan Jobs Commission.

Update 2000

Current Status: In a 1999 survey conducted for MDE by IDEA Consultants, Inc., a random sample of district superintendents indicated that 75% of districts had written guidelines related to technological skills that graduating students are expected to have when they complete high school.

Next Steps: Some possible steps should include:

- Review/revise the K-12 student technology education competencies, ensuring these are aligned with the International Society for Technology in Education (ISTE) student standards released in 1999 and the International Technology Education Association Standards for Technological Literacy updated in 2000;

- Exchange information about post-K-12 expectations regarding technology capabilities;
- Reaffirm instructional technology standards across the curriculum;
- Gather data regarding the type and number of participants of partnerships between school districts and local businesses, community colleges, universities, and community organizations; and
- Encourage districts to work with the Michigan Department of Career Development on school-to-work programs

Citations:

Michigan Center for Career and Technical Education (MCCTE)
http://mccte.educ.msu.edu/
Michigan Dept. of Career Development
http://www.state.mi.us/career/
Michigan's School-To-Work Network (STW)
http://im.tcimet.net/STW/Pdocs/STW-Welcome.cfm
ISTE NETS for Students
http://www.iste.org/standards/index.html
ITEA Standards for Technological Literacy
http://www.iteawww.org/TAA/STLstds.htm

Recommendation 4: Training

Ongoing training opportunities that build the general level of technology expertise of educators throughout Michigan must be significantly expanded.

Challenge: The shortfall in training and professional development opportunities is routinely identified as Michigan's most pressing need related to technology-assisted teaching and learning. All educators, but especially teachers, must upgrade their skills if technology is to be effectively integrated into teaching and the curriculum, and also support the administrative responsibilities of schools. More training opportunities are needed to increase the capabilities and comfort levels of educators with new technologies that possess instructional and administrative value. Without such training and subsequent technology use, schools have difficulty demonstrating a fair return on dollars invested in technology hardware, software, and infrastructure.

Rationale and Implementation: An online survey conducted by the State Superintendent's Educational Technology Advisory Group (ETAG) in October 1997 produced overwhelming support—over 95% of more than 400 respondents—for increasing training opportunities to build the general level of technology expertise among educators in Michigan. This is not surprising since *Education Week* (November 1997) reported that just 10 percent of Michigan's teachers had at least nine hours of technology training. The MDE should act as a facilitator in increasing the number of training opportunities, working in conjunction with educational organizations, colleges and universities, local and intermediate school districts (ISDs), and regional educational media centers (REMCs) and other non profit and private agencies. A prompt review of the training needs of teachers and other educators is needed, followed by an assessment of which training needs are being met, in whole or in part. The critical next step is supplementing existing training programs to meet the shortfall in training opportunities. Delivery mechanisms must be explored that help overcome the shortage of substitute teachers, which prevents many teachers from being released from regular classroom duties. Technology itself can be an alternative strategy in helping to deliver training of all types, including the acquisition of continuing education units (CEUs) by teachers. A model of multi-institutional collaboration has been SupportNet, a one-year initiative of the Merit Network, funded through the Michigan Public Service Commission, to deliver Internet training and help desk services to a core of the state's educational community.

Resources: Staff resources of MDE, especially through 1998, are necessary to launch the implementation of this recommendation. Since the expense of training programs is significant, considerable input and support is essential from educational organizations and institutions, with a long-term commitment that emphasizes leadership and financial support necessary from local school districts. To help leverage local and regional resources, MDE will earmark a significant amount of the state's apportionment of the federal Technology Literacy Challenge Fund program in 1998 to provide financial support for technology training initiatives. Collaborative training initiatives involving schools, school districts, libraries, health care facilities, nonprofit groups and private businesses can help minimize training costs not only in rural and remote regions of Michigan, but also in the state's urban and central city areas.

Success: A review of technology training needs and existing training programs will be completed by a coalition of educational organizations and institutions, led by MDE, no later than June 1, 1998 (or an alternate date pending a schedule for receiving applications and making funding decisions for the state's administration of the Technology Literacy Challenge Fund program). By September 1, 1998, the State Board of Education will approve Technology Literacy Challenge Fund grants intended to aid in establishing and/or supplementing existing training programs. Ultimate success will be achieved when a significant majority of teachers and other educators in Michigan have the skills necessary to better incorporate technology into the educational and administrative missions of schools. An annual survey of K-12 schools, such as that conducted by

MDE and Quality Education Data (QED) in 1997, could be instrumental in the collection of this information.

Update 2000

Current Status: Progress on a statewide review of training needs and existing training programs was not completed. However, a number of new training opportunities have been implemented both through MDE's direct efforts and through cooperative projects that include partnerships with businesses and universities. While specific training needs were not identified, 83% of a random sample of superintendents surveyed for MDE by IDEA Consultants, Inc. rated training as their highest technology priority in 1999. According to the 1998-99 QED survey, districts offered an average of 100 total hours of training for teachers but 60% of this was for basic operations and applications.

- State, regional and district Technology Literacy Challenge Fund (TLCF) grants included training components.

  Statewide projects in Cycle 2 and 3 including teacher professional development were "Academy for the 21st Century," "Best Practices of Technology Integration," "Michigan Teacher Network" and the "Michigan Technology Training Resource." "Implementing Technology in an Educational Context" provided professional development focusing on administrators and school board members.

  In addition, ten regional TLCF Cycle 2 projects were funded in the 1998-1999 year for a total of $5 million with 20-40% of those dollars supporting professional development. Regional plans in Cycle 4 were required to focus on professional development or connectivity, with a minimum of 20-40% for training.

  At the local level, 77% of TLCF projects included professional development with an average of 30% of funding per project covering this activity. In Cycle 3, 86% of funded projects included a professional development component.

- Next Day Grants in 1997-98 and 1998-99 included projects specifically targeted at teacher training.

- MDE serves on the Board and is providing support to the "Ameritech Technology Academy," a project to train 5000 teachers from 2000-2001 under the guidance of the Michigan Association of Computer-related technology Users in Learning (MACUL).

- Working cooperatively, school districts and teacher preparation programs are creating professional development partnerships to deliver state-of-the-art technology instruction to enhance the performance of both students and teachers. Examples include the Genesee Intermediate School District's GET-IT program and Lansing School District's Educational Technology Certification partnership, both supported by TLCF funds.

- Statewide training developments have been highlighted in a recent article profiling Michigan programs, one of four high-quality statewide models featured in the national journal. (E. Hoffman & G. Thompson. (2000). "Putting the Research to Work: Professional Development Models from Michigan." TechTrends 44(2): 20-23.

- The Michigan Technology Improvement Program, funded under Cycle 4 TLCF, includes professional development as part of the Sustained Learning Regions center which is a joint effort of MDE and ISDs around the state.

Next Steps: Under the leadership of MDE, an infrastructure system is needed for the collection, evaluation, and dissemination of information from these programs. MDE will continue to earmark a significant amount of the TLCF apportionment in future funding cycles to training and support for professional development.

Citation:

SupportNet, Merit Network, Inc.
http://www.merit.edu/k12.michigan/supportnet/

Governor's Next Day Teacher Innovation Grants
http://www.trico-associates.com/nextday/

Ameritech Technology Academy
http://ameritechacademy.org/

Recommendation 5: Technology Budgets and Training

Each school district should dedicate, on a recurring basis, a specific and significant portion of its technology budget for ongoing staff training to assist with the effective and efficient use of instructional technology.

Challenge: A significant percentage of public and nonpublic school teachers in Michigan are characterized as having only beginning technology skills or, worse, no skills at all, according to *ProjectEdTech*, a 1997 survey of K-12 school buildings in the state by Quality Education Data (QED) and the Michigan Department of Education (MDE). Yet support for technology training for teachers and other school staff to integrate technology into the educational and administrative missions is inconsistent from one school to the next.

Rationale and Implementation: As educators integrate technology and related telecommunication services into their curriculum and their budgets, they often overlook the need for money to boost the technical capabilities of teachers and staff. Establishing a budget item dedicated to technology training is a constant reminder to schools and school districts to invest in human resources. This strategy should be reflected in a district's technology plan. Intermediate school districts (ISDs) and regional educational media centers (REMCs) should continue to assist local districts in planning and implementing this recommendation.

Resources: Local school districts must be creative in using funds from a variety of sources to assist in ongoing technology training, including annual operating dollars, grant funds and savings achieved from participation in the federal Universal Service Fund. A 1995 report *(Teachers and Technology: Making the Connection)* of the U.S. Office of Technology Assessment suggested that at least 30 percent of a school district's technology spending should be dedicated to staff training. States such as Texas have adopted that model, but a survey by Quality Education Data in 1996-97 reported that, on average, districts earmark only five percent of their technology budgets for training. By comparison, estimates for private sector investments in technology, computer and/or technical skills training range from 30-40 percent of total training funds (American Society for Training and Development), to 30 percent of total operating budgets (*Training Magazine*). Others informally claim that private sector institutions routinely invest 50 percent of a total technology budget in technology training and support.

Success: The successful implementation of this recommendation depends upon schools establishing a regular budget item that addresses the need to support technology training for teachers and staff. Further, these allocated funds must be substantive enough to address the identified training needs.

Update 2000

Current Status: According to the 1998-99 Quality Education Data survey, local school districts were spending less than 10% of their average $540,000 technology budgets on professional development. This was an increase over the 8% in the year before. To assist in promoting staff development, TLCF Cycle 4 Local and Regional applications required 20-40% of the grant amount to be allocated for professional development either through grant dollars or in-kind contributions by the district or other financial sources. TLCF funds for professional development were included in a significant number of local grant projects in all cycles.

Next Steps: Some deeply entrenched barriers toward progress on this recommendation must be removed—in particular, the lack of investment in staff development. The U.S. Department of Education recommends that 30% of technology budgets be spent on technology training for teachers in the national technology plan, (*Getting America's Students Ready for the 21st Century*, 1996).

Citations:

ProjectEdTech (1996-97): Tech Survey Report, Quality Education Data and Michigan Department of Education
http://www.mde.state.mi.us/tplan/qed.shtml

Universal Service Fund Information Page Merit Network
http://www.merit.edu/k12.michigan/usf/

Recommendation 6: Teacher Competencies

The State Board of Education and leading educational organizations in Michigan must reiterate the importance of new teachers having the ability to use information technologies to enhance teaching and learning.

School districts must be encouraged to include technological competency as an aspect of teacher hiring and evaluation.

Challenge: The use of technology in classrooms is growing in Michigan, but according to *ProjectEdTech*, a 1997 survey of K-12 school buildings in Michigan by Quality Education Data (QED) and the Michigan Department of Education (MDE), public schools and nonpublic schools rated only 15 percent and 11 percent of their teachers, respectively, as having advanced technology skills. When hiring new teachers, districts should consider applicants' knowledge of and ability to use technology.

Rationale and Implementation: Teachers must be increasingly proficient not only in the operation of computers, video equipment and similar technologies, but also in their ability to instruct students in the use and application of these technologies. The State Board of Education and MDE have an immediate role in implementing this recommendation through the approval of a seventh skill standard—one that emphasizes the importance of new teachers having an ability to use information technology to enhance learning—to the *Entry Level Standards for Michigan Teachers*.

This will lead to technology skills being incorporated into the other six skill areas to achieve maximum effectiveness. Colleges and universities that train teachers should evaluate their programs, including the degree to which they include technology-related recommendations of the National Council for Accreditation of Teacher Education (NCATE). Local school districts should include the use of technology skills as an important component in the hiring and evaluation of teachers. Some local districts may need to develop policies that address technology-based performance expectations for teachers.

Resources: Financial resources necessary to implement this recommendation are relatively minor, unless a college or university must make major investments to effectively train new teachers to comply with seventh skill standard requirements. The ongoing approval and review processes administered through MDE's Office Professional Preparation Services already monitor compliance with state guidelines and should incur no significant cost increase due to a new standard.

Success: A key measurement of accomplishment is the implementation of the seventh skill standard focusing on technology to the *Entry Level Standards for Michigan Teachers*, then its adoption by colleges and universities that train new teachers. Long-term, but less easily measured success would be illustrated by having all local school districts in Michigan employ technology competency as an important aspect of teacher hiring and evaluation. MDE could incorporate a question addressing formal technology training for teachers in an annual survey of K-12 schools, such as the one conducted with Quality Education Data (QED) in 1997.

Update 2000

Current Status: In the 1998-99 QED survey, school administrators identified 25% of teachers as having advanced or instructor-level technology skills.

In July 1998, the State Board of Education approved the addition of a technology standard to the Entry-Level Standards for Michigan Teachers. This technology-focused standard, based on the

International Society for Technology in Education (ISTE) standards, is commonly referred to as the Seventh Standard because it was appended to the existing six standards previously adopted by the state. The new technology standard is being implemented by teacher preparation institutions in developing instructional programs and for assessing student teacher competence in the use of technology for teaching and learning. Compliance with the standard is being monitored during the periodic review of each institution's teacher preparation programs on a five-year cycle.

The Consortium for Outstanding Achievement in Teaching with Technology (COATT), a coalition of the state's schools and colleges of education, was established through the efforts of Senator Carl Levin to recognize preservice teachers who demonstrate excellence in the use of technology to enhance student learning. Assessment for the award is based on the seventh standard. The first preservice awards were made in spring 2000. A program to recognize outstanding technology using practicing teachers began in late 2000.

While the seventh standard is supporting improved technology skills for new teachers, the 1999 Quality Education Data survey indicated that only 20% of schools required teachers to demonstrate technology capabilities in the hiring process. Michigan does not require technology training for continuing certification, a factor shared with 45 other states according to data reported by *Education Week* in 1999. In a 1999 survey of school superintendents conducts by IDEA Consultants, Inc., 13% indicated their districts had written technology competency guidelines for their teachers.

The Michigan Department of Education is working with a task force to develop a graduate-level endorsement for educational technology as part of teacher certification. This endorsement will be based on the ISTE standards.

Next Steps: As a result of the adoption of the seventh standard and the ensuing programs for preservice teachers by Michigan schools and colleges of education, the models are in place for identifying or developing technology-related competencies for practicing K-12 teachers or for inclusion in a new educational technology endorsement program for previously-certified teachers. Such a model should also incorporate the ISTE Technology Standards for Teachers released in June 2000.

The Seventh standard should be widely disseminated to intermediate and local school districts so school administrators will be aware of what newly prepared teachers may be expected to know.

Competencies are important for all educators, not just teachers. Standards should be developed for administrators at the state and local levels.

Citations:

ProjectEdTech (1996-97): Michigan: State Tech Survey Report, Quality Education Data and Michigan Department of Education
http://www.mde.state.mi.us/tplan/qed.shtml

Seventh Standard, Entry-Level Standards for Michigan Teachers, Michigan Department of Education
http://www.mde.state.mi.us/tplan/presrvtech/index.shtml

National Educational Technology Standards for Teachers, International Society for Technology in Education (ISTE)
http://cnets.iste.org/index3.html

Recommendation 7: Information Clearinghouse

The Michigan Department of Education (MDE) should work with local and intermediate school districts (ISDs), regional educational media centers (REMCs), colleges and universities, libraries and educational organizations to create an electronic, statewide clearinghouse intended for the discovery and exchange of "best practices" in technology-centered learning, teaching and educational administration.

Challenge: The application of technology in education lacks the definition and standards of an established discipline, yet educators are expected to know about a vast range of technology-related issues. Topics include integrating technology across the curriculum protecting the confidentiality of school records, addressing student access to inappropriate electronic content, and addressing the "Year 2000" problem. It is an arduous and time-consuming task for teachers, media specialists and school administrators to locate documents that identify research and methodologies focusing on "best practices" in the integration of technology into the curriculum and school management functions.

Rationale and Implementation: A clearinghouse would enable educators to learn from the applied research and practice of other education professionals. The coordination of this recommendation rests with MDE, though the identification and evaluation of many "best practices" models must be accomplished in conjunction with local school districts, ISDs, REMCs, colleges and universities, and other educational organizations. MDE is pioneering a clearinghouse of this type (the Michigan Statewide Systemic Initiative's Dialogue Web project) and has created other, smaller scale resources (a technology planning page to assist with the update of the State Technology Plan). All information providers must feel ownership of the clearinghouse, as all would be expected to contribute to its resource base.

Resources: Resource obligations would be nominal for each participating organization sharing technology-related information of use to schools, but requirements on the part of the institution managing the clearinghouse might involve more significant staffing and information dissemination capabilities and commitments. MDE may earmark a small portion of federal dollars allocated under the 1998 Technology Literacy Challenge Fund program to help launch a state educational technology clearinghouse. Much dissemination of "best practices" models can be accomplished electronically.

Success: The creation of an organizational framework in which a statewide information technology clearinghouse would operate is a first step toward success, to be accompanied by an evaluation process for "best practices" models. This phase should be completed by October 1, 1998. The launching of the service itself, including the sharing of information resources by educational institutions in Michigan, should occur by June 1, 1999.

Update 2000

Current Status: The leadership of MDE relating to Recommendation #7 is apparent in the agency's funding of two statewide Technology Literacy Challenge Fund (TLCF) projects over a two-year period: the "Michigan Teacher Network" and "Dialogue Web." TLCF investments topped $1 million in that period. Both projects offer resources focusing on teachers and teaching using technology including identifying "best practices" for educators. The "Michigan Teacher Network" identifies digital content linked to the *Michigan Curriculum Framework (MCF)* for teachers, allowing a search by keyword or MCF areas. Resources are selected by practicing school media specialists from around the state.

Continued development of clearinghouse initiatives is being funded through Cycle 4 TLCF. This will build on existing resources while expanding capabilities and resources as part of the Michigan Technology Improvement Program (MTIP) through the Awareness and Dissemination Clearinghouse.

MDE is working with the Michigan Virtual University and a task force of educational organizations on a project to develop a portal for educators in the state that will provide a one-stop, customizable interface to online educational resources for Michigan educators. While still in the pre-planning phase, the portal would be a major step in achieving this recommendation.

Next Steps: One critical element for the integration of technology into curricular areas is the expanded identification of high quality, teacher-tested digital content that fulfills specific curricula standards and benchmarks. MDE needs to take a leadership role in facilitating a comprehensive database of digital resources linked to specific learning objectives, enabling educators throughout Michigan to select and evaluate technological resources against specific teaching and learning needs. Several other states have models that bear review for the web-based resources for teachers as well as professional development resources. Two examples are:

- Georgia's Learning Connections site at http://www.glc.k12.ga.us
- Utah's Educational Technology site at http://www.usoe.k12.ut.us/curr/edtech/

Citations:

Michigan Teacher Network
http://mtn.merit.edu
Dialogue Web
http://mssi.mde.state.mi.us
Michigan's State Technology Planning Page
Michigan Department of Education
http://www.mde.state.mi.us/tplan/
Michigan Electronic Library
http://mel.lib.mi.us/
Universal Service Fund Information Page
Merit Network, Inc.
http://www.merit.edu/k12.michigan/usf/

Recommendation 8: Technology Staffing Levels

The Michigan Department of Education (MDE) should work in collaboration with local and intermediate school districts (ISDs), regional educational media centers (REMCs), professional educational organizations and accrediting agencies to recommend voluntary professional and technical staffing guidelines needed to maintain effective educational technology programs in schools and school districts, and in regional K-12 service agencies such as ISDs and REMCs.

Challenge: Technology support, especially basic assistance, is often overlooked by schools when implementing a technology program. Practicing teachers rarely have time or the skills to perform functions such as the installation, maintenance, and repair of classroom computers, video cameras, or other electronic tools. Yet, according to *ProjectEdTech*, a survey of K-12 school buildings in the state that was conducted in 1997 by Quality Education Data (QED) and the Michigan Department of Education (MDE), more than a third of the public schools and nearly a half of the nonpublic schools indicated that they rely on teachers to handle technical maintenance and support functions.

Rationale and Implementation: The coordination of this recommendation is the responsibility of MDE, with input from the State Superintendent's Educational Technology Advisory Group (ETAG). Educators must address technical support in school technology plans and in the technology components of school improvement programs. Guidelines in determining appropriate support levels are needed. California and Alabama now highlight the critical need for schools to have specialized staff for technical support, maintenance, and repair.

Resources: Staff from MDE combined with input from interested educational institutions and organizations are the primary resources needed to ensure that voluntary technology staffing guidelines are identified for schools and school districts. The eventual dissemination of guidelines can be achieved electronically at minimal cost.

Success: Technology staffing guidelines for schools should be identified by December 31, 1998, then disseminated by MDE and affected educational organizations and institutions soon after. The ultimate indicator of success for this recommendation is reflected in the number of schools and school districts in Michigan that meet the voluntary technology staffing guidelines.

Update 2000

Current Status: In a survey of school superintendents by IDEA Consultants, Inc. for MDE in 1999, 81% indicated that their districts were not able to offer sufficient support for teachers. The issue of support remains a critical area for schools, despite the fact that 58% of the superintendents indicated their districts provided a "lot" of support. By contrast, less than 19% of 140 technology coordinators informally surveyed by MDE in 1999 thought their districts provided a lot of support.

Through a statewide TLCF Cycle 3 grant—Michigan Technology Training Resources, a draft document of the "Technology Staffing Guidelines" has been developed and is being tested by several districts. Input was gathered from focus groups across the states as well as from representatives of local and intermediate school districts (ISDs), regional media centers (REMCs), and professional organizations serving on the steering committee. An online tool helps districts assess their support capabilities.

Next Steps: To be a viable technology planning tool, funding must continue to ensure that the Staff Guidelines remains a dynamic and evolving instrument assisting districts as they annually to review their technology plans. Distribution and inservice on using this planning tool for

appropriate staff in the field should be explored through the centers of the Michigan's Technology Improvement Project (MTIP).

Citations:

ProjectEdTech (1996-97): Michigan: State Tech Survey Report. Quality Education Data and Michigan Department of Education
http://www.mde.state.mi.us/tplan/qed.shtml

Michigan Technology Staffing Guidelines, Merit Network
http://techguide.merit.edu

Recommendation 9: Supplementary Technical Support

School districts should identify and utilize individuals in their local and school communities who have expertise in the use of appropriate technologies and the ability to work with teachers, staff, administrators, parents and students to increase the efficiency and effectiveness with which technology is applied in the learning environment.

Challenge: Many schools and some school districts cannot afford to have full- or part-time persons on staff to assist teachers in integrating technology across the curriculum or to provide them with the needed technical support. Even when staff resources are present, they may be overwhelmed by immediate tasks and hard pressed to keep up with the introduction of new technology and to assist in its appropriate use.

Rationale and Implementation: Local school districts, with assistance from their intermediate school district (ISD) and/or regional educational media center (REMC), are positioned to establish programs providing supplementary support for the integration of technology across the curriculum, as well as in school administrative functions. A wide variety of human resources may be available, including other staff and teachers, students, parents and community members. In particular, students should not be overlooked. By high school, 71 percent of them are using computers as an adjunct to learning, according to *Computers and Classrooms*, a 1997 Educational Testing Service publication. Informal technology assistance from clerical and administrative staff, or more formal mentorship programs with teachers helping other teachers can be considered. Parental help and volunteers from the business community—for example, Tech Corps Michigan—provide additional options. Online technical support available via the Internet can provide access to human resources. The MDE can contribute by working with educational organizations to identify model programs to serve as examples.

Resources: A program through which a school or school district can provide supplementary staff support for technology may demand at least a temporary reassignment of staff time to help build long-term support capacity.

Success: An initial, informal measurement of success for this recommendation would be the interest expressed by schools and school districts in identifying models on which they could base the creation of a technology support program of their own. A question related to the manner in, and degree to which, schools utilize talent in their communities could be incorporated into an annual survey of Michigan schools, as was conducted by Quality Education Data (QED) and MDE in 1997.

Update 2000

Current Status: One program to expand school-community links was provided by MDE under the aegis of the TLCF grants to implement Tech Corps Michigan. Tech Corps Michigan operates under a charter with Tech Corps USA. The goal of Tech Corps Michigan is to assist schools in finding and making good use of the volunteers from businesses, other public agencies, as well as private individuals who have skills and knowledge which is of value to schools. Over a two-year funding period, the Tech Corps in Michigan has established working models in 15 public school districts across the state. Participants are being trained using the national Tech Corp model adapted specifically for educational technology.

The "Michigan Technology Training Resource," funded in Cycles2-3 TLCF, included SupportNet Online, an online resource focused on providing technical training and support to district technology support staff and classroom teachers.

MDE's Educator-on-Loan program is also designed to provide teacher-to-teacher support and assist districts in increasing local capabilities. For the 1998-1999 school year the Educator On-Loan, Marilyn Western, traveled across the state working with district staff members on strategies for integrating technology into the curriculum. The range of inservice ranged from the one-computer classroom to lab settings. In the 1999-2000 school year, two Educators On-Loan, Jane Frank and Jody Whitmer, expanded the direct support to teachers with the program continued by Becky Skutt in 2000-2001.

In a review of a random sample of district technology plans submitted to MDE in 1997-1998, 53% of 106 plans described collaborative activities with business, higher education, public libraries, and/or community organizations, most often in the areas of professional development and technology support.

Next Steps: Individual school districts should incorporate the community involvement piece as a part of their district technology planning process.

Citations:

Tech Corps Michigan
http://www.wmich.edu/techcorps

MDE Educator on Loan
http://www.mde.state.mi.us/school/eol/index.shtml

Recommendation 10: Infrastructure Support

The Michigan Department of Education (MDE) will work cooperatively with state agencies, educational organizations and others to assist in the establishment of a broad-based user group which will address issues related to and formulate strategies to deal with:

1. coordination among local and regional initiatives to build statewide networking capability;
2. equitable access to and affordable costs for high-quality telecommunications services throughout Michigan;
3. technical standards and network operating protocols;
4. support and technical assistance to ensure quality statewide network operations; and
5. financial resources and purchasing programs to benefit educational technology initiatives.

Challenge: For schools to utilize technology for educational programs beyond their own walls and geographical boundaries and to access global information resources, they need the nation's Information Superhighway. This is an important concept in Michigan's effort to ensure equitable educational opportunity for all students. However, the ability of every school in the state to establish a high-quality voice, video and data connection to every other school in Michigan does not yet exist nor is there a timetable for its establishment and implementation. Individual schools and school districts have limited ability to influence such a large-scale, statewide development.

Rationale and Implementation: The vision of Michigan having a voice, video and data network accessible by all of the state's educational institutions was promoted in *Michigan's State Technology Plan (1992-1997)*, then reinforced in a plan by the Michigan Department of Management and Budget (DMB) in 1995 to create the Michigan Information Network (MIN). The primary impetus for the creation of this network must come from the Governor's Office and the Michigan Legislature. Other participants must be the Michigan Department of Education (MDE), DMB and its Office of the MIN, the Michigan Jobs Commission, the Michigan Public Service Commission, the Library of Michigan, and educational organizations representing user groups from around the state. MiCTA (formerly the Michigan Collegiate Telecommunications Association), the Merit Network and many large corporate technology users and providers of telecommunication services could provide beneficial help. An initial step is to revisit the MIN plan to identify what has and has not been accomplished, what may no longer be necessary, plus what has transpired since 1995 that may affect the plan. Another step is to evaluate the impact of the federal Universal Service Fund (USF) program on providing schools with more affordable telecommunications services.

Resources: The primary resources needed to implement this recommendation are staff commitments from MDE, other state agencies, and educational organizations with a stake in the creation of a MIN.

Success: The establishment of a broad-based user group to facilitate the implementation of a MIN should be in place no later than October 1, 1998. The user group should conduct a review of the MIN plan by December 31, 1998, then turn its ongoing attention to assisting in the network's realization.

Update 2000

Current Status: Communication has been maintained between the MDE staff and Michigan Information Network (MIN) staff to explore efforts to support districts in obtaining USF funding to support infrastructure purchases. Applicants for the TLCF grants must leverage appropriate purchases with USF discounts and through group pricing through the REMC and MiCTA organizations. MDE supported MIN's efforts to secure an adequate assessment of the statewide telecommunications infrastructure in Michigan. This includes a statewide USF application for 2001 that will ease the burden on districts in applying for funds and a plan that will include purchasing options that will promote standards and high quality communications infrastructure.

TLCF grants have been used to assist local districts in obtaining additional infrastructure. During Cycle 2, 43.3% of districts included connectivity projects in funded programs, with 52.1% in Cycle 3.

Next Steps: MDE will maintain communications with MIN to provide support aimed at increasing the level of funds coming to Michigan through USF discounts for school districts and libraries.

MDE needs to develop an online means for submitting and validating technology plans that can assist districts and schools in meeting the planning requirement for obtaining USF discounts.

Through the implementation of the Center for Educational Performance and Information (CEPI), a data warehouse for the state's schools, information on connectivity will be systematically collected. This data should be analyzed to better understand the status of voice, video, and data network capabilities and barriers.

Citations:

Michigan Information Network
http://www.min.state.mi.us/
Michigan Education Information System (MEIS)
http://www.mde.state.mi.us/off/dat/meiswarehouse.pdf
Merit Network, Inc.
http://www.merit.edu/
MiCTA
http://www.micta.org/

Recommendation 11: Technical Standards

The Michigan Department of Education (MDE) will work cooperatively with other state agencies and interested organizations to identify and disseminate communications standards for voice, video and data networks, plus facilities renovation and construction standards with optimal specifications for the design of technology-rich learning environments.

Challenge: Network design involves a high degree of technical sophistication and expertise not commonly found in schools and school districts since their primary purpose is the instruction of students. Educators often lack necessary resources and expertise to design and create voice, video, and data networks that will be compatible with statewide communications networks. In some cases, the need for new technologies to be interoperable with existing school systems is overlooked. Also, the school buildings are, in many cases, more than 40 years old and were not designed for modern technology. School administrators and technology coordinators need reliable information about networking architectures, electrical service demands, cable pathways and equipment closets and the provision of assistive technology. Too often, educators rely solely on the vendor for technical advice and support.

Rationale and Implementation: This recommendation requires a collaborative effort between MDE, the state's Office of the Michigan Information Network (MIN), telecommunication services providers, existing networking entities such as the Merit Network and MiCTA (formerly the Michigan Collegiate Telecommunications Association), architectural firms and educational technology consultants, plus interested educational organizations. A special task force under the auspices of the broad-based user group identified in Recommendation 10 should be charged with the responsibility of identifying and disseminating standards and resources related to the construction and renovation of school facilities and the design of networking infrastructures. An initial effort at identifying standards to which schools could refer was included in the *Final Report of the MIN Planning Committee*, submitted to the Michigan Department of Management and Budget (DMB) in 1995.

Resources: Primary resources needed to implement this recommendation are staff commitments from affected state agencies such as MDE, the Michigan Department of Management and Budget (DMB) and its Office of the MIN, plus interested educational organizations, businesses, telecommunication services providers and other parties. Primary dissemination of eventual standards and guidelines can be accomplished via MDE's web pages (MDEnet), with supplementary distribution in hard copy format.

Success: A set of construction and renovation standards, accompanied by recommended network infrastructure guidelines, should be completed and disseminated by December 31, 1998.

Update 2000

Current Status: While no specific projects are currently focused on creating a uniform standard for technology, MDE has worked with other agencies including MIN, MICTA and Merit Network, Inc. on projects that will assist districts in understanding and implementing standards based communications networks. Through a statewide application under USF, MIN and MICTA are developing a process that will further assist districts in improving their infrastructure using high quality, standardized options.

Next Steps: This topic should be considered by the MTIP steering committee in determining priority funding activities. MDE should continue work with MIN, and assist in dissemination of information on infrastructure opportunities.

Recommendation 12: Model Technology Plan

The Michigan Department of Education (MDE) will establish a model technology plan or identify an existing model plan, including elements necessary for an effective planning process and ease of incorporation into school improvement plans, to serve as a guide and to accelerate the preparation of quality planning documents by local school districts.

Challenge: The importance of schools planning effectively for technology programs has been apparent for many years, but only in 1997 did this activity became a practical mandate. The federal Universal Service Fund (USF) program requires that school districts have state-approved technology plans to be eligible to receive discounts of 20 to 90 percent on many telecommunications services, including Internet access and internal wiring. Many districts have been forced to hastily develop technology plans. They may have to upgrade existing plans and seek state approval to continue participation in the USF program. School districts often lack the onsite expertise to guide them in such a thorough planning exercise.

Rationale and Implementation: If school districts in Michigan fail to adopt quality technology plans, key funding initiatives such as the USF program could be jeopardized. A model plan prepared or identified, then disseminated by educational interests such as intermediate school districts (ISDs), regional educational media centers (REMCs), colleges and universities, and MDE would serve as a starting point and guideline for school districts needing assistance. The model plan should address issues such as integrating technology into the curriculum, prioritizing and establishing timelines for technology acquisition, funding technology programs and evaluating the impact of technology investments. Districts using the model plan should tailor it to meet local circumstances and integrate it into the technology component of school and school district improvement plans. A sample technology plan created by the Gratiot-Isabella Regional Educational Service District in 1997 may serve as the basis for a model. In addition, model assistive technology plans have been developed by Wayne County RESA and Oakland Schools.

Resources: The Michigan Department of Education may award a small amount from the agency's 1998 allocation in the Technology Literacy Challenge Fund program to implement this recommendation. If the Gratiot-Isabella RESD plan or another existing model can be utilized, the cost to implement this recommendation would be minimized. The expense of disseminating a model plan would be modest if it is distributed electronically.

Success: At least 95 percent of the local school districts, public school academies and nonpublic schools should have quality technology plans in place by December 31, 1998.

Update 2000

Current Status: Approximately 80% of the school districts in Michigan have technology plans in place. Although all plans have the elements needed to be eligible for USF discounts, the quality varies.

Through a statewide TLCF funding project—"Implementing Technology in an Educational Context," a white paper on assessing the technology planning process was developed for school administrators and school boards, as well as an online district technology plan assessment instrument. Additional resources on improving planning from this project are available for districts on the project's web site.

MDE is partnered with Gratiot-Isabella RESD under a Cycle 4 TLCF grant in deploying an online technology plan development process to serve as a guide to districts as they work on developing new plans and/or revising current plans, many of which expire in the year 2000. This site includes

a model plan based on an earlier one developed by Gratiot-Isabella and used by many districts in their initial technology planning in 1997-1998. This model plan will be improved through research being conducted jointly by MDE and Eastern Michigan University on technology planning in Michigan school districts. Training for plan reviewers is included in the project.

Next Steps: MDE in cooperation with MIN should develop a process to ensure district technology plans are updated on a yearly basis with comprehensive revisions every three to five years. Work should continue towards creating a process that will combine technology planning with other school plans including School Improvement Plans to help schools focus on unified reform efforts.

Additional professional development is needed to assist schools and districts in improving and assessing their planning processes. This is an area which should be addressed through the Michigan Technology Improvement Program centers.

Citations:

MDE K-12 Technology Planning Web Site (2000)
Gratiot-Isabella RESD
http://techplan.org
USF Technology Plan Information for Michigan K-12 Schools, Merit Network, Inc.
http://www.merit.edu/k12.michigan/usf/action/k12.html

Beyond the Technology Plan
http://www.trico-associates.com/techlit/EffectiveInvestment.html
Technology Plan Assessment Instrument, Michigan TechCorps
http://www.edzone.net/tech_plan/
Technology Planning for Michigan School Districts
http://www.trico-associates.com/techlit/plan.html

Recommendation 13: Technology Appropriation

The Michigan Legislature should provide an annual appropriation of funds in the state's School Aid Act specifically for the purpose of implementing technology-assisted learning programs, with districts that receive funds being subject to three basic stipulations. Districts must: 1) have a technology plan that is in compliance with state and federal requirements; 2) supply a matching dollar value from local resources; and 3) demonstrate that real savings gained from participation in the federal Universal Service Fund (USF) program have been reinvested in additional technology, technology upgrades or training, or related expenditures.

Challenge: The demand on existing foundation allowances for many school districts under Michigan's School Aid Act far exceeds the dollars available. Finding funds to improve and implement technology strategies for enhancing student achievement and district productivity is a difficult task. Greater support from the state would help schools invest in the technical and human infrastructures that increase technological capacity and greater statewide equity of access to technology-assisted learning resources.

Rationale and Implementation: The Governor's Office and the Michigan Legislature must work jointly to establish an annual appropriation under the state's School Aid Act to fund technology-related expenses. This appropriation must take into account the effect of the Durant settlement on educational technology funding. Without such an appropriation in the School Aid Act, the implementation of local technology programs is likely to continue to be fragmented and concentrated in districts with greater local resources. Funding sources other than local budgets are often restricted to infrastructure, or can require extensive staff input to prepare grant applications—human resources that many districts may not possess. An annual appropriation for educational technology in the School Aid Act will establish a recurring source of dollars on which school districts can rely. School districts must also identify resources on the local level that can be used as a match for state dollars, as well as demonstrate that they are using savings gained from the USF program. School districts also must have a technology plan to assure that all funds for educational technology—from state, local or private sources—are spent wisely and have a positive effect on student learning.

Resources: Educational interests in Michigan must commit the staff resources necessary to gain legislative support for an annual allocation for educational technology in the School Aid Act. A specific technology-focused expenditure proposal must be developed. Schools must identify sources of matching funds.

Success: Obtaining approval to include an annual appropriation of funds for educational technology in the state's School Aid Act should be accomplished by the close of the current legislative session, December 31, 1998. An actual appropriation of dollars would occur during the subsequent legislative session, to be available during the 1999-2000 school year.

Update 2000

Current Status: In a survey conducted by the Milken Exchange for Educational Technology for Education Week in 1998, Michigan was shown to be one of six states that did not provide direct funding to school districts for technology. A major step forward in supporting technology at a state-wide level is the one-year program to provide laptop computers for all teachers, the Governor's Teacher Technology Initiative (TTI). Further work remains to be done to address the issue of ongoing funding required for systematic change.

Next Steps: The MDE should take the leadership role in facilitating a task force composed of representatives of school districts, professional educational organizations, businesses, universities, and other stakeholder groups to inform the legislature and public of the need to fund educational technology throughout the state.

This effort should be considered as a component of the State Board of Education policy development in the technology area.

Citation:

Universal Service Fund Information Page
Merit Network, Inc.
http://www.merit.edu/k12.michigan/usf/

Governor's Teacher Technology Initiative
Michigan Virtual University
http://www.mivu.org

Recommendation 14: Funding Flexibility

Educational interests should work with state and local policymakers to propose and seek approval of legislation that would amend the state's School Code to allow for more flexibility in spending building and site sinking funds, as well as bond funds, for technology-related expenditures.

Challenge: The existing School Code in Michigan does not permit the expenditure of building and site sinking funds for acquiring equipment such as computers and peripheral devices. It does allow for the construction of networks with respect to cabling. Therefore, school districts may wire buildings for network operations, but have no means of activating the network because funding for termination equipment is not available. Bond funds may be used by schools for initial purchases, including customized application software, but software upgrades are not acceptable expenditures. The current School Code also prohibits the use of bond proceeds to lease telecommunications services. Such a restriction may prevent the most effective use of limited resources. The potential for technology to benefit education will not be fully realized as long as school districts' ability to finance these advanced products and services is limited.

Rationale and Implementation: School districts, their representative organizations, and interested parties must work with state policymakers to develop and approve legislation to amend the state's School Code. Amending the School Code as recommended—possibly including a provision requiring that school districts have technology plans in compliance with state and federal requirements—would provide another option for schools to fund hardware, software and, in some cases, access fees needed to operate voice, video and data networks. Currently, the acquisition of end-user equipment must come from each district's general fund or from special resources such as grants, bond funds and fundraisers. Since many districts are already severely taxed for day-to-day operations, significant dollars for the acquisition of computers and peripheral devices may not be available. General fund budgets are strained by secondary costs related to technology acquisition, such as maintenance, software, and training expenses.

Resources: Commitments are necessary from school districts and interested educational organizations and agencies to develop and advocate on behalf of amending the School Code as proposed.

Success: Legislative approval should be obtained by September 1, 1998, for amendments to the Revised School Code, Public Act No. 291 of 1995. An amendment to Section 380.1212 should include enabling language to expand the scope of the law to include the use of sinking funds for technology equipment. An amendment to Section 380.1351a should allow the use of bond funds for long-term leases for telecommunications services and the acquisition of application software.

Update 2000

Current Status: Progress on this recommendation did not occur as expected. There was no change in the School Code.

Next Steps: With the new legislature now in place, the need for apprising state policymakers of the continuing need for legislative amendments to facilitate funding options for school districts to keep up-to-date technology systems in place is imperative. ETAG recommends that MDE form a task force comprised of representatives from ISDs, local school districts, and professional organizations for the purpose of devising and implementing a plan of action for legislators. This plan of action would address the need to amend the school code in this area. The task force would work during the 2000-2001 school year to affect change in the status quo by June, 2001.

Recommendation 15: Collaboration

Educational institutions should make every effort to maximize the funding support and assistance available from public and private sources by establishing collaborative arrangements with other schools, school districts, colleges, universities, libraries and similar entities to aggregate demand for technology products and services, and where real savings result from participation in initiatives such as the Universal Service Fund (USF) program, these dollars should be designated for additional technology-related investments.

Challenge: Public and private funding initiatives to assist schools with the acquisition of technology for classroom and administrative uses are placing a greater premium on collaborative endeavors that maximize the positive impact and value of investment for each project. Since 1994, with the dedication by the Michigan Public Service Commission of excess earnings of Ameritech to support educational technology, schools have been increasingly conscious of the need to work with others, including libraries, health care facilities, nonprofit organizations, and private businesses. However, this need to collaborate has not yet been fully realized by all educational institutions. Such partnerships benefit all participants.

Rationale and Implementation: Schools realize with increasing frequency that their demand for technology and telecommunications services—such as Internet access, bandwidth for interactive video programming and even basic telephone service—is similar to the needs of colleges, universities, libraries, health care facilities, nonprofit organizations, private businesses, and governmental agencies. Collaborative purchasing and leasing agreements drive down prices. Fiscal efficiencies can be achieved by school districts if they reinvest savings from the federal USF discount program to help extend existing funding for technology. Those savings can be applied to activities such as staff training which may not be eligible for support under other funding programs. Basic strategies and decisions regarding technology funding and support rest with local administrators and governing boards. However, the Michigan Department of Education (MDE) with input from the general education community should place emphasis on the need for collaboration—and even the reinvestment of USF savings—in guidelines that the agency prepares for the Technology Literacy Challenge Fund program and other grant projects. MDE should utilize the expertise of the State Superintendent's Educational Technology Advisory Group (ETAG) in developing criteria and an increased focus for the administration of the Technology Literacy Challenge Fund program in 1998.

Resources: Leadership and a staff commitment by schools and school districts, and by their potential partners in collaborative projects, are necessary. A commitment of staff is also essential by MDE.

Success: One measure of success is an informal evaluation of the quality of grant applications received by MDE that feature strong partnerships between schools and other entities. In addition, the number of Michigan schools and school districts participating in the USF program should reach 90 percent by December 31, 1998. The reinvestment of USF savings by educational institutions will be more difficult to measure, but could be subject to an independent federal review.

Update 2000

Current Status: To date, there has been no systematic assessment of partnership activities. However, many of the TLCF grants include partnerships with universities, community colleges, ISDs, and businesses. An initial measurement of accomplishment features an increase in the

number of school partnerships involving business, community colleges, universities and community organizations. There is some evidence to support this from the number of Cycle TLCF 3 grants supporting partnerships, notably seven of the eight statewide projects, all of the five online projects and several of the regional projects. There are some local projects involved in partnerships but no specific data are available at this time.

In a review of a random sample of district technology plans submitted to MDE in 1997-1998, 53% of 106 plans described collaborative activities with business, higher education, public libraries, and/or community organizations, most often in the areas of professional development and technology support.

One program to expand school-community links was provided by MDE under the aegis of the TLCF grants to implement Tech Corps Michigan. Tech Corps Michigan operates under a charter with Tech Corps USA. The goal of Tech Corps Michigan is to assist schools in finding and making good use of the volunteers from businesses, other public agencies, as well as private individuals who have skills and knowledge which is of value to schools. Over a two-year funding period, the Tech Corps in Michigan has established working models in 15 public school districts across the state. Participants are being trained using the national Tech Corp model adapted specifically for educational technology.

The REMC Statewide Cooperative Acquisitions Project is a continuing activity of the REMC Association of Michigan. The project provides volume bid prices to schools through their local REMC (with some services also available to libraries, community colleges and universities that participate or coordinate with their REMC).

Next Steps: With the advent of the Michigan Technology Improvement Program centers, which brings together a large partnership of educational agencies, universities, and other non-profits, MDE should encourage new linkages that can assist in partnership development. The MTIP centers are being developed as part of a statewide coalition for educational organizations which provides a core for such collaboration, and the potential to build additional partnership initiatives with business and other non-profits related to specific initiatives. MDE, in its leadership role for MTIP, should leverage MTIP to build new collaborations.

MDE should continue to play a supportive role in encouraging districts to take advantage of the USF discounts as well as REMC and MiCTA pricing. In addition, suggestions for developing collaboration with local community businesses should be incorporated into the technology planning guidelines as mentioned in Recommendation 12.

Citations:

REMC Association of Michigan Cooperative Purchasing Program
http://isd.ingham.k12.mi.us/~remcam/
Universal Service Fund Information Page, Merit Network
http://www.merit.edu/k12.michigan/usf/
MICTA
http://www.micta.org/
TechCorps Michigan
http://www.wmich.edu/techcorps

Recommendation 16: Statewide Purchasing and Licensing

The Michigan Department of Education (MDE) should work in conjunction with intermediate school districts (ISDs), regional educational media centers (REMCs) and other educational organizations to support and expand existing statewide purchasing, licensing and evaluation programs for items such as full-text online data bases, educational software and instructional video programs, and to identify similar resources in the state's library community that may be available to schools at little or no charge.

Challenge: Inequities in educational opportunity are created when some schools cannot afford licensing fees required for software programs, video titles and online access to electronic resources that provide teachers with instructional tools and students with information necessary for the completion of class projects and assignments. Even those educational institutions budgeting for such expenses find their dollars do not extend nearly as far as those for schools and school districts working cooperatively. Further, educators sometimes have difficulty finding unbiased evaluations of electronic resources to help when making acquisition decisions.

Rationale and Implementation: The Michigan Department of Education (MDE), with participation from ISDs, REMCs and other educational groups, should review existing statewide purchasing, licensing and evaluation programs to determine how they could be supplemented or improved. One model of aggregated purchasing for software and related products has been operated by the REMC Association of Michigan since 1972. In 1996, it saved schools and local and intermediate school districts an estimated $16 million. Other models include MiCTA (formerly the Michigan Collegiate Telecommunications Association), plus the "state contract" administered by the Michigan Department of Management and Budget. AccessMichigan is a $2 million project funded by the Library of Michigan and the Michigan Legislature to make online periodical databases accessible in all libraries and schools in the state. MDE should establish a partnership with the Library of Michigan and designate a liaison to meet regularly with representatives of the library community to keep abreast of resources that may benefit schools, with comparable collaborations encouraged at the regional and local levels.

Resources: Modest staff resources are required by MDE and existing cooperative licensing and purchasing programs to review existing programs and their capabilities, but much more significant is the actual earmarking of funds to purchase or license access to various resources on behalf of all schools in Michigan. Precedent for such an investment was established by the Legislature with its appropriation of $500,000 to help launch AccessMichigan. Additionally, MDE may dedicate a significant dollar amount from the state's 1998 allocation of federal money under the Technology Literacy Challenge Fund for applications providing statewide access to electronic learning resources.

Success: Partial success for this recommendation is determined by the creation of a cooperative effort among MDE and existing purchasing and licensing programs in Michigan to support and expand services to schools and school districts. However, the ability to maximize the success of this proposal will be measured by an infusion of funds that will not only increase services to educational institutions in Michigan, but provide greater and more equitable statewide distribution of electronic learning resources.

Update 2000

Current Status: Progress toward MDE working in conjunction with ISDs, REMCs and other educational organizations has occurred on several fronts. Technology Literacy Challenge Fund allocations for 1998-99 included support for:

(1) the REMC Statewide Cooperative Acquisitions Project. This project also continues to coordinate districts access to the State of Michigan Extended Purchasing Program. The project provides volume bid prices to schools through their local REMC (with some services also available to libraries, community colleges and universities that participate or coordinate with their REMC). Project bid programs include: Online Information Resources, AV Supplies and Equipment, Computer Supplies and Accessories, Instructional, Application and Network Software, Library Supplies (Coordinated with MLC), Coordinate access to the State of Michigan Extended Purchasing Program. Savings for five years from this cooperative effort exceed $78 million dollars.

(2) a statewide initiative for the AccessMichigan program enabling procurement of a license for an on-line database specifically designed for students in grades K-6. To date AccessMichigan reports 279 schools and/or school districts are registered to use the InfoTrac databases with approximately 328 different schools accessing the full-text type periodical databases per month.

(3) 73 local districts and 10 regional projects that, in many cases, will enable the expansion of the capabilities for on-line access from individual schools and classrooms within local school districts. This support will serve to make on-line resources available to a greater number of students, staff and parents.

MDE has also instituted a collaborative component with Statewide TLCF projects so efforts are coordinated to provide more equitable statewide distribution of electronic learning resources.

Next Steps: MDE will continue to foster/facilitate the existing successful REMCs purchasing systems (including identifying hardware, software or other technology systems that are not yet available through statewide or REMC purchasing programs) and collaboration to ensure that future TLCF resources are directed to initiatives that support equitable access to statewide resources at little or no charge. It is incumbent upon individual school districts to take advantage of the savings offered by participating in these initiatives.

Citations:

REMC Association of Michigan Cooperative Purchasing Program
http://isd.ingham.k12.mi.us/~remcam/

MiCTA
http://www.micta.org/

AccessMichigan
http://accessmichigan.lib.mi.us/

Recommendation 17: Advocacy

The Michigan Department of Education (MDE) must step forward to collaborate with—and when necessary marshal and aggregate the energies and resources of—other state agencies, state policymakers, educational organizations and institutions, libraries and businesses to increase public awareness and promote the appropriate use of technology in the learning community.

Challenge: Segments of the general public, including some governmental and educational policymakers, possess limited understanding of the far-reaching evolution in informational technologies and the application of these new technologies to education. Lack of awareness and a fear of the unknown present obstacles to the introduction of technology that can benefit student learning. While many groups and organizations in Michigan, as well as a number of government agencies, have been supportive of incorporating technology into the educational mission, the state has lacked strong champions who are both tireless and vocal in their advocacy.

Rationale and Implementation: Statewide advocates for educational technology can come from within government—the Governor, the Michigan Legislature or a state agency such as MDE—or from one of Michigan's leading educational organizations, or from a combination of sources including the business community. Advocacy and leadership are best when there are multiple entities serving as champions. Efforts should be nonpartisan.

Resources: Time and travel demands on the leading advocates for educational technology will be significant. Staff resources of MDE and other state agencies are needed in supporting roles. The State Superintendent's Educational Technology Advisory Group (ETAG), featuring representatives of approximately 40 educational organizations in the state, can be a significant force in an advocacy role.

Success: The impact of this recommendation can be measured in two steps: 1) there is a strategic and mutually beneficial alliance formed between MDE and other educational technology stakeholders, with strong advocates emerging from this process; and 2) an action plan is developed to increase the knowledge level and understanding of policymakers and the general public related to the use of technology in the field of education. In addition, the successful implementation of other recommendations in MDE's State Technology Plan will, in part, be a measure of the positive impact of this recommendation.

Update 2000

Current Status: No specific programs have been implemented to develop advocacy leaders. MDE's Educator-on-Loan program has provided skilled educators who have spoken to Chambers of Commerce and other organizations to help business and community leaders better understand educational technology issues.

Next Steps: Michigan's Technology Improvement Program (MTIP) was developed to provide a leadership and support that will enable Michigan's schools to improve student learning. This plan will establish a set of interrelated services that are designed to assist local efforts while providing greater coordination between state and regional activities that promote efficiency through collaboration and partnerships. Advocacy is one of the charges for this program.

Recommendation 18: Public Awareness

Schools must expand support for technology-rich learning environments by creating opportunities that promote awareness of, and increase knowledge about, educational technologies currently being used or to be used by students within their communities.

Challenge: A lack of knowledge and awareness regarding the potential for technology to benefit student learning and achievement contributes to occasional resistance by parents, businesses, community leaders and even school board members to the funding, implementation and expansion of school instructional technology programs.

Rationale and Implementation: School technology programs require widespread understanding and support within a community. The purchase and operation of computers, video cameras and monitors, VCRs and other electronic learning tools and associated software, plus the establishment of local and wide area networks and telecommunications links to distant learning resources, demand substantial investment. Educators should be sure community members have a basic understanding of the positive value of technology to education. Schools can work independently or in conjunction with intermediate school districts (ISDs) and regional educational media centers (REMCs) to stage awareness campaigns and host related activities. Methods of showcasing the value of technology in the learning environment include technology fairs, vendor demonstrations, plus classroom visits by parents, community members, and business leaders. Illustrating the use of technology by local businesses will contribute to understanding the significance of technology-assisted learning to student achievement.

Resources: Additional dollars are not required to implement this recommendation, but a periodic commitment of staff time to organize and conduct technology awareness activities is necessary for schools. The Michigan Department of Education (MDE) and leading educational organizations in the state can help local educators by identifying model awareness programs. Dissemination of information could occur electronically, as well as during annual meetings and conferences of organizations such as the Michigan Association for Computer-Related Technology Users in Learning (MACUL), the Michigan Association for Media in Education (MAME) and the Michigan Institute for Educational Management (MIEM).

Success: An initial measurement of success for this recommendation is the amount of interest expressed by schools and school districts in identifying models on which technology awareness programs can be based, with a data base of such models organized by MDE. An indirect measurement is the support given by voters to local funding initiatives that involve a technology component.

Update 2000

Current Status: Increased public awareness and support for technology in schools is a critical need. As expenditures for the deployment of technology in schools increase there is more focus on the benefits of these expenditures for improving student learning. There are many "success stories" of the use of information technology throughout Michigan but often these stories are not visible beyond the particular classroom where they occur. According the 1998-1999 QED survey, 23.1% of districts were using technology extensively to enhance communications between administrators, teachers, students, and parents. In a 1999 survey of superintendents, 94% indicated that their districts had web pages accessible by the public. The "Michigan Teacher Network," a statewide TLCF project, has developed resources for parents as a way to help them better understand the technology environment for learning. The "Improving Technology in an Educational Context"

project has components aimed at educating school boards on technology policy issues. "Academy for 21st Century Schools" included a component to assist schools in outreach to parents.

Next Steps: Efforts to share success stories at the district and state level need to be intensified. The successes resulting from the Technology Literacy Challenge Fund and the Governor's Next Day Teacher Grants provide a good basis for dissemination of information about the benefits of information technology for the young people in our schools. The Department of Education should help to coordinate efforts to disseminate such information in our State. The Michigan Technology Improvement Program centers should be included in these efforts. MDE should be encouraged to use its web site and other resources to highlight educational success stories and high quality projects across the state.

Citations:

Michigan Association for Computer-related technology Users in Learning (MACUL)
http://www.macul.org

Michigan Association for Media in Education (MAME)
http://www.mame.gen.mi.us/

Michigan Teacher Network
http://mtn.merit.edu

Michigan Institute for Educational Management (MIEM)
http://www.melg.org/miem/index.html

Recommendation 19: Administrative Communications

Schools, school districts, the Michigan Department of Education (MDE) and other educational institutions should use technology to enhance communications between teachers, administrators, parents and students, to foster administrative efficiencies and strengthen bonds within the educational community and between schools, parents and the general public.

Challenge: Many schools have yet to fully exploit the potential for technology for greater efficiency in regular administrative and management routines and responsibilities. Even fewer schools incorporate technology into school-to-home communications.

Rationale and Implementation: Technology can assist educators in carrying out numerous administrative functions such as communications, grading, attendance, course scheduling, and transportation and food service management, especially with the presence of a local area network within a school building and a wide area network linking each school to district offices. Schools generally have the power to increase communications within the school community and between teachers and parents using voice mail, electronic mail (e-mail), plus district, school and teacher web pages. Cable television access channels provide opportunities for community outreach. Staff training and professional development can be enhanced using interactive video technology. MDE should continue to model the use of administrative technologies by offering online access to and submission of grant applications; expanding Web-based solutions for data collection and dissemination; developing an electronic mail notification system for the distribution of emergency, time-sensitive information; creating electronic discussion groups focusing on MDE programs and services; examining options for providing statewide voice and/or video access to state educational policy proceedings; and establishing an interactive videoconferencing facility.

Resources: The impact of this recommendation on staff resources would be modest if all that is needed is leadership and the full utilization of existing technology across the complete range of instructional and administrative applications. However, the cost of increasing basic school technology capabilities by acquiring additional equipment or capacity could be significant. Further, the introduction of new hardware and software is accompanied by a need for staff training.

Success: Key indicators would be improved information sharing between school districts and the MDE, along with a future increase in the use of technology by schools and school districts to create greater administrative efficiencies and to support communications with parents. Unfortunately, no base line data has been collected to which future comparisons can be made, but this will be added to an annual survey of Michigan schools, such as the one conducted by Quality Education Data and the Michigan Department of Education in 1997.

Update 2000

Current Status: MDE has worked to improve communications with districts using technology. Examples of this include:

- In an effort to improve communications with school districts, the MDE completed an interactive video conference system in December of 1998 with training sessions beginning in January 1999.
- For the Technology Literacy Challenge Fund Cycle 4, MDE provided grant workshop via statewide video conferencing, developed an online pre-application, and distributed all update information via the web or e-mail.

- Establishment of an email list for technology coordinators throughout the state, to enhance both communications to and from MDE as well as provide a peer-to-peer support mechanism. The email list is an outgrowth of a statewide conference hosted by MDE for technology coordinators which is intended to become an annual event.

MDE has also expanded the use of the Internet for data collection through the Center for Educational Performance and Information (CEPI), a new data warehouse that will be a central repository for school information. One result of this effort is a renewed effort by districts to examine their own capacity for collecting critical data which can improve school decision making.

Next steps: With the development of the Michigan Technology Improvement Program centers in 2000, the potential for new administrative communication capabilities will be enhanced through interactive conferences, email lists, and other activities. The MTIP steering team should examine the potential for increasing such interaction.

MDE should continue to develop its integration of technology for administrative functions and communications to establish leadership in enterprise re-engineering, and work with other agencies and educational organizations to create a statewide system to support e-learning. In particular, MDE should focus efforts on using its web site and email to improve communications with local districts and schools.

Recommendation 20: Electronic Learning Community

A content-based, virtual educational network should be established that incorporates instructional and administrative functions in a statewide electronic learning community that is accessible by all schools in Michigan.

Challenge: Many recommendations in *Tech Plan '98* call for the dissemination of information and a sharing of resources among members of Michigan's educational community, yet electronic communications among educators in the state are fragmented. There exists no single path—a source to which educators can turn on a daily basis—for the equitable delivery of information, utilization of scarce resources and resolution of problems common to all.

Rationale and Implementation: Content disseminated via an electronic educational network in Michigan would be the shared responsibility of the users. No single organization, agency, or other entity would be designated as the manager or sole provider of program content. The concept of an electronic learning community is already being pioneered in the state: the Michigan Statewide Systemic Initiative's Dialogue Web focusing on mathematics and science education; and the Michigan Department of Education's Michigan Education Information System (MEIS) and Education Data Network (EDN) assisting in data collection and payment processing. The ability to establish this electronic learning community is dependent on the telecommunications infrastructure in Michigan and the individual networks of multiple providers.

Resources: The Michigan Department of Education (MDE), with input from the State Superintendent's Educational Technology Advisory Group (ETAG), must establish a framework for organizing what now are fragmented efforts among educators and state agencies to communicate and share resources. MDE must support efforts to fully activate the Michigan Information Network, the network of networks on which statewide educational communications could occur.

Success: The concept of an electronic statewide learning community will be realized when all schools in the state utilize a common telecommunications infrastructure as a cost-effective way of communicating and sharing information resources and learning opportunities. Educational interests and policymakers should strive to reach this goal by the year 2000.

Update 2000

Current Status: An initial step toward the implementation of this recommendation and the creation of a statewide electronic learning community is embodied in one grant award by MDE from the Technology Literacy Challenge Fund (TLCF) program provided to the "Dialogue Web" project for two years. Dialogue Web was designed to be a vehicle for communication and dialogue among educators. Some new projects have been created such as the Michigan Virtual University. Collaborative environments are also a part of the new Michigan Technology Improvement Program funded under Cycle 4 TLCF.

Next Steps: There needs to be a concerted effort by any state or organizational entity to construct a vision of the "big picture" in terms of illustrating the widespread potential of full voice, video and data communications between educational institutions and facilities throughout Michigan. Discussions of a collaborative Michigan educational web portal project should also be continued as a way for improving collaborative communications.

Citations:

Dialogue Web
http://mssi.mde.state.mi.us

Michigan Virtual University
http://www.mivu.edu

Recommendation 21: State Technology Plan

Tech Plan '98 must serve as "a living document" to be reviewed, supplemented and assessed, at minimum, on an annual basis by the State Superintendent's Educational Technology Advisory Group (ETAG), with new policy proposals and proposed modifications of existing policies forwarded to the State Board of Education for consideration.

Challenge: A state educational technology plan with a standard life span of three, four or five years cannot remain vital in a rapidly changing environment where technological innovations and instructional applications of technology occur continually. The evolution of technology does not recognize or reflect governmental or educational activity cycles. An outdated plan or outdated recommendations in a plan fail to provide leadership to the state's educational community.

Rationale and Implementation: A model for educational policy documents undergoing annual review is included in the Michigan Revised School Code of 1995. Section 1277(1) mandates that local school improvement plans undergo an annual review, while Section 1277(2)(f) addresses methods for effective use of technology by local districts. The actual review and assessment of *Tech Plan '98* should be a function of ETAG, with staff assistance from the MDE. MDE must continue its participation in efforts to collect, update and process base line data, including the maintenance of its *Inventory of Instructional Telecommunications Systems in Michigan*. It is expected that the primary mode of disseminating *Tech Plan '98* will be via the World Wide Web, which allows for periodic and convenient updates.

Resource: MDE staff serves a liaison and support role to ETAG. Each of the approximately 40 organizations that are members of ETAG must commit a representative to actively participate in the technology plan review and assessment process.

Success: The completion of an annual review and assessment of *Tech Plan '98* is the basic determinant of success. Another primary success indicator, but one less easily measured, is that the Plan not only remains a vital policy document assisting schools and other educational institutions in guiding the application of technology in the learning environment, but that it also is recognized as being more relevant and helpful because of the annual review and assessment process. The degree to which schools see the Plan as an important, dynamic "living document" could be the focus of a question in an annual survey, such as the one conducted by MDE and Quality Education Data (QED) in 1997.

Update 2000

Current Status: The annual review process began in January, 1999. The initial process involved an ETAG sub-committee preparing updated information for each recommendation. Data from the Quality Education Data survey released in August, 1999 and the 1999 School Improvement Superintendent's Survey results released in December, 1999 were used to provide statistical support to antecdoctal information for recommendations as appropriate.

Next Steps: Include a plan of action for each recommendation in the update as well as reliable sources for data that provide evidence of success for each recommendation.

Revise the plan to focus on clear and measurable objectives accompanied by an evaluation process that will determine areas of success and identify additional or evolving needs.

Review and revise the plan to reflect changes that are being made as a result of a revised National Technology Plan, due for release in late 2000.

Ensure that the new Superintendent and State Board of Education are actively involved in future revisions, and that plans are developed in conjunction with other efforts at state and local levels to leverage successes.

Appendices

The appendices for the Technology Plan have not been changed since the 1998 document and are not included here. These are available online at http://www.mde.state.mi.us/tplan.

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