version 3.5

Guidebook

for Developing an Effective Instructional Technology Plan

Prepared by
Graduate Students at Mississippi State University
for
National Center for Technology Planning
www.nctp.com

Participating in
TKT 8763—Seminar in Planning for Instructional Technology

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NCTP
National Center for Technology Planning

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[*Minor Revisions—March 2002*]

Table of Contents

Special Notice: Since the original publication of this Guidebook, Version 3.0, many of the authors have completed their graduate degrees and have either moved on to a professional position or are pursuing a higher-level degree. Also, I retired from Mississippi State University in December, 2000, and am operating NCTP full-time now. Such is the nature of change in technology—constant progress!

This document was created using Adobe PhotoShop 5.0™, Adobe Acrobat 4™, and Adobe PageMaker 6.5™. Typefaces used are: Times New Roman, Garamond, Arial, New Berolina MT, and VinerHand ITC.

Preface

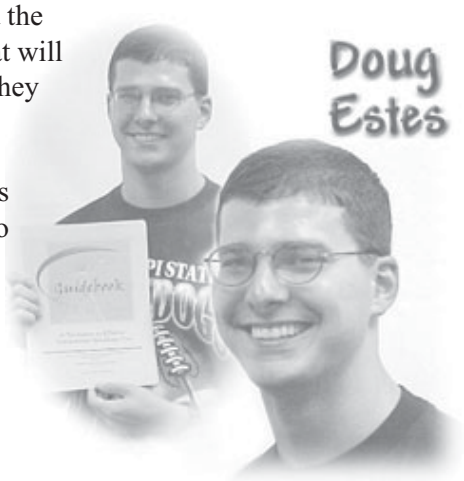
As a result of the very important, and much appreciated, consistent comments, suggestions, and critiques to the National Center for Technology Planning (NCTP), we present Version 3 of the *Guidebook for Developing an Effective Instructional Technology Plan*. You made Version 2.0 a roaring success and, as a result of your helpful suggestions, the future looks extremely bright for this release. It is the sincere hope of all the personnel involved with the development of this document and with NCTP that you gain immeasurable benefit from using the *Guidebook*.

Words simply cannot express appropriately how much I revere the extremely deliberate work of the graduate students with whom I am privileged to work here at Mississippi State University in the Instructional Technology program. They heighten my thinking; they encourage me to strive for higher levels of scholarship, and they help me understand new ways of approaching traditional concepts. These marvelous colleagues cannot possibly imagine how much I love them, how much I cherish the times we have thought and dreamed together, and how much strength I draw from them each time I get to be in their midst. Now, I take great pride in sharing with you, my friends around the globe, this work, this mere portion of the excellence of which they are capable.

They have worked very hard, for many long hours, and with sincere, piercing dedication. I continue to be amazed when I ponder how many long nights—even the "all-nighters"— they gave to this project. At times, it looked like the project might not "come off." Yet, they pressed forward, undaunted by temporary setbacks. So, here we have it—the *Guidebook*.

Each of the graduate students enrolled in my *Seminar in Planning for Instructional Technology* course contributed a portion of this updated work. There were, however, a few individuals who gave of themselves, above and beyond the "ordinary." I wish to pay special homage to them here, because this important document would not have come to fruition had they not made the extra efforts they offered so freely. Especially, in the final hours of prepublication, yeoman duties were performed by Jennifer Blount, who devoted her talents in accomplishing the graphics layout and by pulling everything together into Adobe PageMaker™.

Now, the "super eagle," the Chief of this entire project was Doug Estes. He volunteered, early on, to assume the leadership role for revising the *Guidebook*. Nobody, especially Doug, could have imagined just how much work this project would take! Yet, he gave numerous hours, many into the wee hours of the mornings, to ensuring that this *Version 3.0* would come to life. What a remarkable young man!! I take great pride in knowing that, when the covers of the book started rolling off the press, Doug captured the very first one for his own! In this picture, you can see Doug as he clutches "Serial No. 1" tightly—as well he should! Thanks, Doug. I salute you, my young friend! Thank you for sharing your spirit with me and for providing such stellar leadership to your peers. Also, on behalf of technology planners around the globe, I thank you for ensuring that we now have a fantastic new aid that will help to ensure that technologies are used sensibly, regardless of where they may be found. Just know that "Dr. A" is immensely proud of you!!



If you, the reader, have any comments, suggestions, or recommendations for how we might make Version 4 of the Guidebook still better, please do not hesitate to contact the National Center for Technology Planning (http://www.nctp.com) or any of the authors.

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Authors

We offer this document in hopes that it aids in the task of developing an effective technology plan. At the time of publication, we accept that this document is one that will be revised continually, just as the technology plans for which this is written. We thank the authors who have worked on the previous versions of the Guidebook for their contributions, and offer our excitement for those who will develop future versions.

Students created the original version in June 1995; the second version was published on May 7, 1996; and this version was published on June 7, 1999. Taking the work of art at hand, we revised and added several sections. The names listed below are not accompanied by email addresses due to the fact that many have graduated and the addresses would not be active. If you would like more information on the authors of the Guidebook, contact Dr. Larry Anderson, larry@nctp.com. The following authors created Version III:

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Process

Introduction

The way the universe was created is a debate that has been around, and will probably continue, for years. There is, however, one fact that is common to all sides of the issue—everything had to begin somewhere. In this application to technology planning, there has to be a beginning of a formal technology planning process. In the following pages, you will find several steps in beginning and implementing the technology planning process and product. The information in this guidebook is geared toward educational institutions; however, adaptation for other situations, such as a business or industry, would be relatively simple. This is NOT intended to be a formula for developing the perfect technology plan—rather, only several aspects that we think are important to include when developing an effective technology plan that is unique to the school, community, and industries in your area.

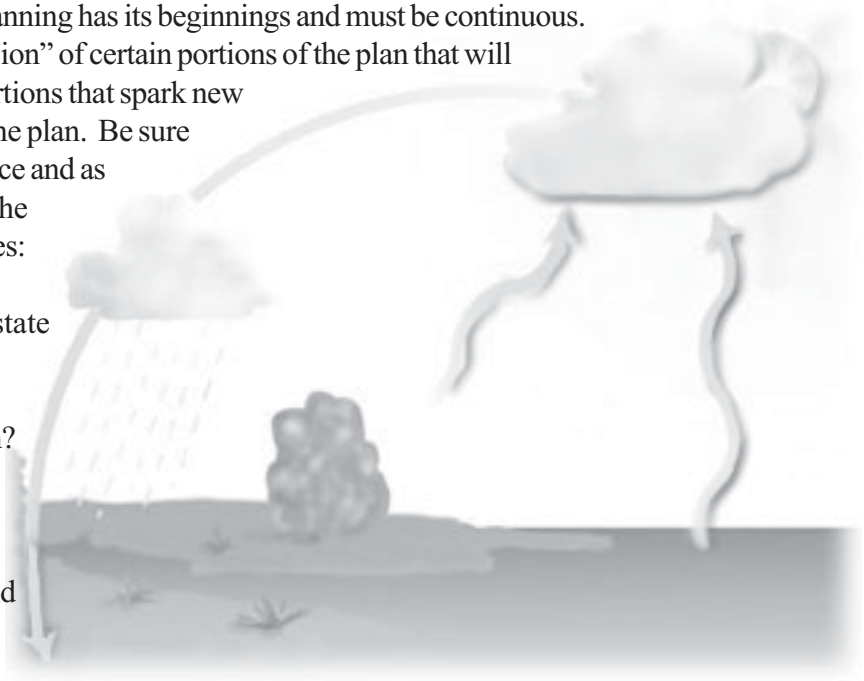
In addition, we have tried to be very aware that information in this guidebook will be used by planners in multiple international locations. We wish we could write this so the information would have a balanced global appeal. The fact remains, though, that this was written in the United States, by U.S. educators, so it will have, unavoidably, a U.S. "slant." This is not an apology—just a statement of reality.

The Purpose of Technology Planning

The idea of technology planning should be an attempt to be proactive instead of reactive to the situations created by technology planning. In order to be proactive, the goals and objectives that are contained within the document should encompass the needs as well as the desires of the area educators, parents, community, and all others in the surrounding environment. The document that will be created as a result of this planning process is only a catalyst that provides for the change taking place in the technological characteristics of the educational system. The purpose of technology planning is not only to create a document, but also to provide a foundation on which an effective curriculum of technology use in education can be built and maintained.

The Planning Process

Think of the cycles of precipitation. A cycle starts when rain comes down. Next the water is absorbed into the ground and used by plants. The excess runs off into streams, lakes, etc. Evaporation then takes place where the process begins all over again. We know that this process began somewhere, and continues every day, just like the process of technology planning has its beginnings and must be continuous. As the cycle continues, there will be "erosion" of certain portions of the plan that will need heavy revision, and there will be portions that spark new ideas and growth in the effectiveness of the plan. Be sure and document activities for future reference and as a resource to the planning document. In the planning process, keep in mind these issues:



- How can we best assess the present state and future needs of our school?
- How can we provide for ongoing evaluation and assessment of our plan?
- How often should the various committees meet?
- What surrounding technologically-advanced educational institutions could we visit?

- What conferences, workshops, and expositions can we attend to increase our knowledge of technological advancements?
- What is the availability of planning resources, people, and needed documents?
- How should planning responsibilities be divided?
- What should we be reading?
- How best can we communicate our message to the community?

The Planning Document

If you have ever seen a photograph of a beautiful sunset, you knew that it was the best possible representation of that moment, second only to being there. The planning document you will create should be the best possible representation of the hard work and effort you and your committee have accomplished. In this guidebook, key elements are presented that we feel are essential in preparing an effective written technology plan.

The elements you will find are presented in the general order most technology plans are written; however, as mentioned earlier, this is not a formula and does not imply that this is the best possible order. There are many possible choices for order, some components listed may not be necessary, and there may be additional components needed that are not listed in this guidebook.

Important Tips for Successful Implementation of the Plan

- When progressing toward the goals and objectives set forth, keep in mind the vision and mission statements.
- Allow for everyone to be involved.
- When dealing with risk-taking to learn technology skills, remember that we must risk going too far in order to discover just how far we can go.
- Develop relationships with "Techno-eagles" who will help you stay abreast of emerging technologies.
- When things do not go as planned:
  - Relax—Keep calm and don't panic.
  - Realize—Realize that this process requires constant monitoring and adjustment.
  - Reevaluate—Take a step back, look at the situation, and use your resources to continue toward your goals.
- Delegate responsibility wisely when dealing with implementation locally and district-wide.
- Generate motivational tactics for those teachers and administrators who might be reluctant to allow for implementation of the program. Remember, **BE PROACTIVE!!**

Important Tips for Evaluation of the Plan

- Review and revise the plan **at least** annually.
- Encourage feedback and suggestions, and make provisions as to how these will be used when revising the plan.
- Ask questions such as:
  - How and what is being accomplished? (Implementation)
  - How can we make it more successful? (Evaluation)
  - What are our steps in making these changes? (Revision)

Content created/edited by Doug Estes
Graphics and layout by Jennifer L. Blount

Cultural Diversity in Educational Technology

Educators and facilitators of technology are entering a new millenium. As we face this exciting challenge, we recognize that there are several key issues that must be addressed in educational technology. One of the most crucial of these issues is cultural diversity in the technology-enhanced classroom.

It is imperative that facilitators of instructional technology plans examine what cultural backgrounds exist in a given environment so that it can be determined what culturally diverse groups will be affected by the plan. Our society is becoming more multicultural every day. Teachers of technology should understand the meaning of cultural diversity, multiculturalism, and the effect these concepts have on a technology-enhanced environment.

Many individuals assume that cultural diversity and multiculturalism have the same definition, but that is not the case. Diversity can simply be defined as "a difference." In a given environment, two students are diverse if one wears eyeglasses and the other one does not wear eyeglasses. Educators should understand that being culturally diverse can be used to describe a variety of states and characteristics. The majority of individuals relate cultural diversity to ethnic background, national origin, and race, but that is not always the case. Other culturally diverse characteristics are age, height, weight, religion, and sexual orientation. Multiculturalism is the act of respecting the various cultural differences that exist in a given society. For example, an educator who recognizes and respects the culturally diverse students in a classroom is practicing multiculturalism.

Many educators use technology as a way to penetrate the cultural barriers that exist between and among diverse students. Today, educators can use the Internet to communicate with schools in other countries. By doing this, students in one culture are allowed to interact with students in another culture via videoconferencing or e-mail, allowing them to learn more about their culture and heritage. Often, by learning about a culture that is different from our own, we discover facts about our own culture that were not apparent to us before the interaction.

Technology can also be used to aid students who speak a different language by allowing them to complete computer tutorials and multimedia activities. Larry Irving, the Assistant Secretary for Communications and Information for the U.S. Department of Commerce, spoke at the Rocky Mountain Arts and Technology conference about technological innovations such as multimedia. In his address, he stated that "the Internet and multimedia technologies can also provide the means for self-expression." By completing multimedia projects, teachers and fellow classmates can learn a great deal about a student's cultural backgrounds, ideals, and beliefs.

However, technology educators need to keep in mind that hands-on computer activities may not be the best way for culturally diverse students to learn technology concepts. Some students are natives of countries that do not value computers as highly as other countries. For example, students who come from third-world countries may not have been exposed to technology due to health, nutrition, and hygiene issues. They do not value technology as highly because for many of them their basic needs have not been met. Also, educators should not use technology solely as a reward system for students who perform well in the classroom. Many teachers will allow students to use the computer when they have completed class work or acquired high evaluations. By doing this, the culturally diverse groups may not be treated equally, and they may be the ones who really need the exposure to technology aspects.

Educational institutions should also take the initiative to see that educators are trained to teach culturally diverse groups properly. Among the various groups, various styles of learning will exist. Educators need to be able to research the backgrounds of students and determine their preferred learning style. For example, research shows that Asian students are auditory learners and Hispanic students are visual learners who prefer student-centered activities. Effective teacher training is the key to teaching students who are culturally diverse.

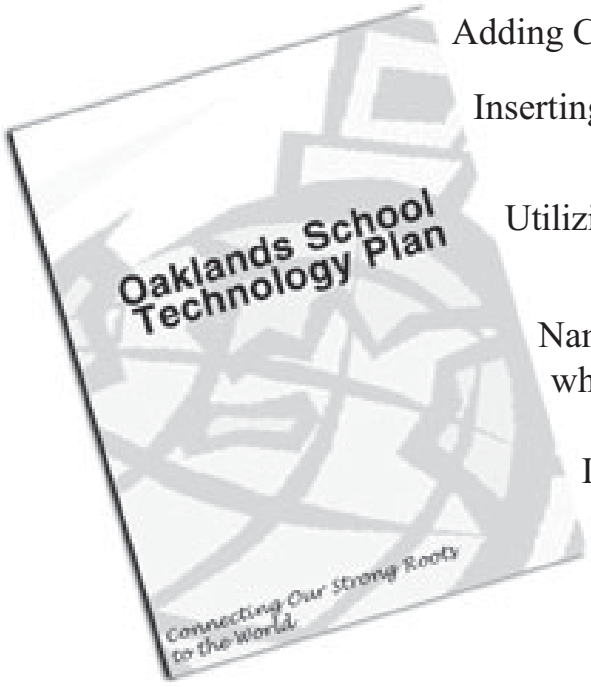
Two of the most significant changes in education are the increasing number of culturally diverse students in the classroom and the rapidly-changing technological curriculums that exist in educational institutions. Additional research should be conducted to determine the influence of instructional technology, as well as method of delivery, on culturally diverse groups.

Researched and written by Aimee C. Chandler

Product

Cover Sheet

The cover sheet sets the mood for a technology plan. A cover sheet should be inviting and attractive. It should visually draw the reader's attention. The cover sheet should be enticing, just as an appealing magazine cover dashed with color and striking graphics. When developing a cover sheet, consider the following:



Adding Color

Inserting Graphics

Utilizing Different Fonts

Name of the Institution for which the plan is designed

Informative, but not cluttered

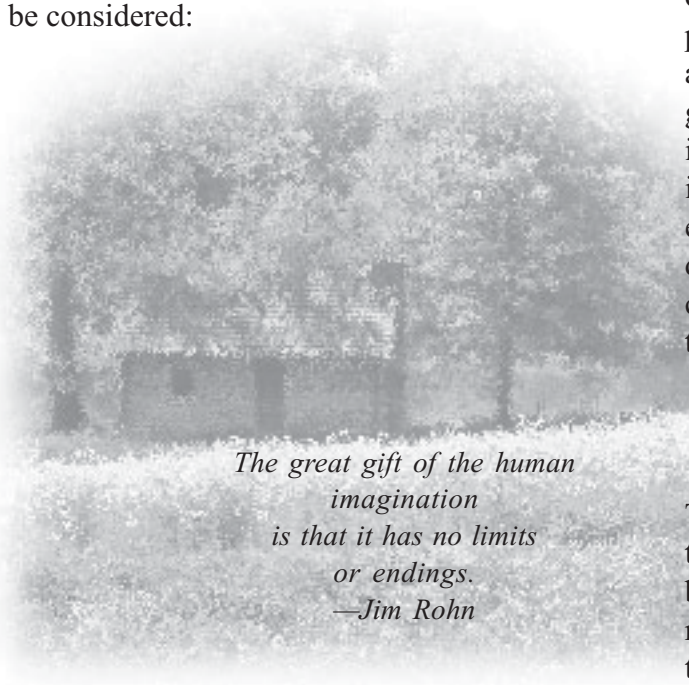
Title Page

A title page is a significant component of a technology-planning document which should convey a good example of clean, professional formatting. It is important that the title you choose tells the reader something specific about the technology plan. When developing a title page, consider adding the following information:

- Include the region in which the institution(s) is located
- Include the date the plan was submitted and/or the date that the plan is to be implemented
- Include the committee or group that developed the plan
- Include an address and phone number for additional information and email if that is available
- Include the web site address for a contact person (if available).

Table of Contents

The table of contents is a crucial component of a planning document because it provides a guide for readers to use in navigating successfully throughout the technology plan. In developing the Table of Contents the following points may be considered:



The great gift of the human imagination is that it has no limits or endings.
—Jim Rohn

- Include all sections of the document.
- Give specific detail for ease of navigation.
- Have detailed page numbers.
- Include leaders (leader dots) for ease of reading.
- Include headings and subheadings, if needed.
- Include headings and subheadings, if needed.

Acknowledgements

An acknowledgements page provides the opportunity to recognize those persons and groups who have contributed toward the completion of the technology plan. In developing the Acknowledgements section these contributions may be considered, but are not limited to:

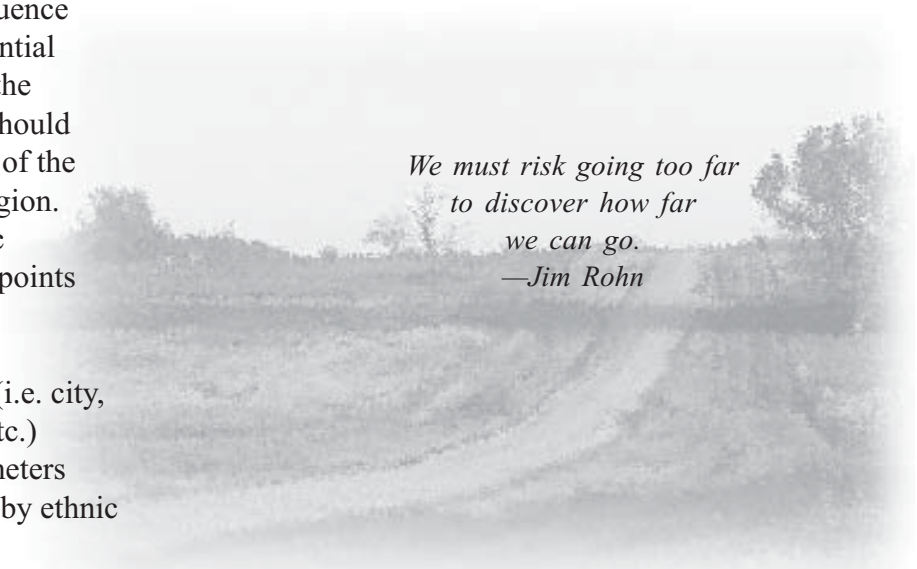
- Time
- Efforts
- Resources
- Financial Support
- Leadership
- Technical Expertise
- Review of Material
- Editing of Manuscripts
- Publisher of Finished Product

If the acknowledgement is for a specific person or organization, then that contribution to the plan should also be cited. If the acknowledgement is for the contribution of a group whose members are also to be recognized individually, it is often best to list these members in alphabetical order. Remembering that everyone who had any part in your planning document should be recognized for their contributions is important so they can feel that their efforts were appreciated.

Demographics

The demographics section gives the blueprint of the area surrounding the organization that will be implementing new technology into its daily routine. The demographics of the area can affect the quality of the technology experience greatly.

Because this section may influence potential industrial and residential development and expansion, the demographic characteristics should consist of all tangible aspects of the surrounding community or region. When collecting demographic characteristics, the following points should be considered:



- Location—Be specific!! (i.e. city, state, province, country, etc.)
- Area—square miles/kilometers
- Population—Distribution by ethnic group, gender, and age
- General accreditation or degree levels of all users and instructors
- Income: household and per capita
- Number of new Internet technology users, history, and projections
- Any other interesting information that you feel would portray an accurate picture for the reader of your plan

Committee Membership

Strong technology plans involve several committees made up of key persons. Depending on the type of organization, potential committee members should include, but are not limited to, the following:

- Students/Employees
- Parents
- Community members, especially contributors
- Faculty members
- Administrators/Management
- Technology Coordinator
- Business persons
- Laypersons
- Librarians
- Administrative support personnel
- Technology professionals, including consultants
- Human Resources personnel
- Public Relations personnel
- Safety coordinators

In choosing committee members, some factors for consideration should include: a past history of willingness to invest their time and interests in the organization's endeavors; past committee memberships; strong indications of interest in this area; formal or informal leadership positions in the community or organization; persons with known influential positions; and vocal/energetic trendsetters. Representation of all groups is imperative.

Points to consider when establishing and working with committees include the following:

- A leader who is assertive, committed, self-motivated, and flexible should be chosen for each committee.
- A recording secretary is essential. This person will be responsible for recording all meetings and distributing the minutes.
- Meetings should be scheduled on a regular basis at a time that is convenient for the majority of members.
- The leader should be able to delegate authority to those in each committee. Committee members should be given job descriptions so their roles and responsibilities will be clear to themselves, individually, to each other, and to the purposes of the entire group.
- Job descriptions for the technology coordinator, as well as other key personnel, should be included in the technology plan. An organizational chart may be useful as visual representations often help people to understand

relationships existing among positions, and the responsibilities that accompany the relationship.
- Committee members should be encouraged to visit each site in their area, as well as other organizations, to compare existing technologies.

Executive Summary

The Executive Summary, which serves as an abstract of your technology plan, should provide a short overview of what the plan is, how and why it came into being, and what it hopes to accomplish. Since in many cases the executive summary is the only section of the plan that will be read in its entirety, its importance cannot be overemphasized.

Like an abstract, it should be placed near the beginning of the planning document so that it is easy to locate. The summary should be kept brief, a maximum of two pages, and it should communicate quickly the major points of the plan to the reader.

General Introduction

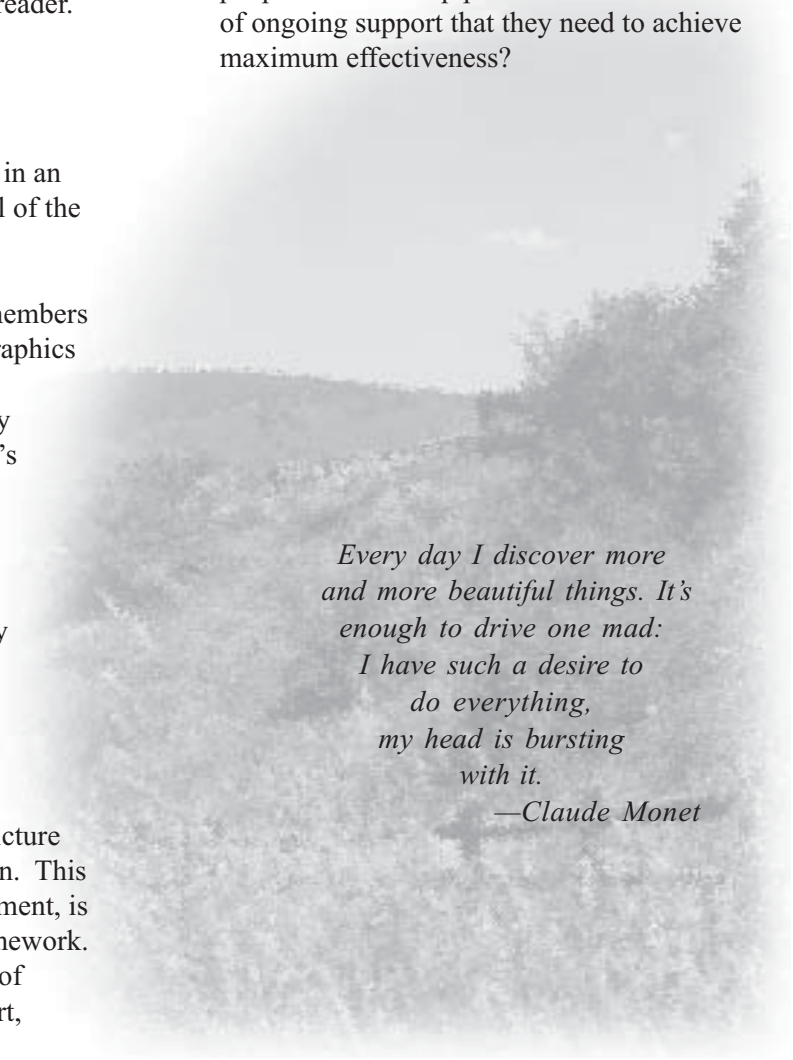
The general introduction should be written in an abstract form that could include some or all of the following factors:

- Number of schools, students, faculty members
- School district and community demographics
- School's organizational structure
- Purpose of the school in the community
- History of the committee—committee's beginning, who is involved, stages of committee, and its activities
- Short-term and long-term goals
- Stakeholders—students, teachers, administrators, parents, and community
- Community resources

Vision Statement

A vision statement represents the overall picture depicting the future of your technology plan. This component, coupled with the mission statement, is the foundation for the technology plan framework. Creating a positive attitude toward the use of technology will take sufficient time, support, commitment, teamwork, and flexibility. When constructing a vision statement, consider the following:

- What future desires do we see for technology and education in our organization and community?
- What will our work area(s) of the future look like and include?
- How will technology be infused with daily instruction and activities?
- How and at what level will technology users achieve?
- How should the community be involved?
- What kinds of skills, competencies, and attitudes must be nurtured for technology infusion to be successful?
- How and in what new ways will our community be called upon to provide continuing support for technology-related activities?
- What dreams do we have for ensuring that all people in leadership positions receive the kind of ongoing support that they need to achieve maximum effectiveness?



Every day I discover more and more beautiful things. It's enough to drive one mad: I have such a desire to do everything, my head is bursting with it.
—Claude Monet

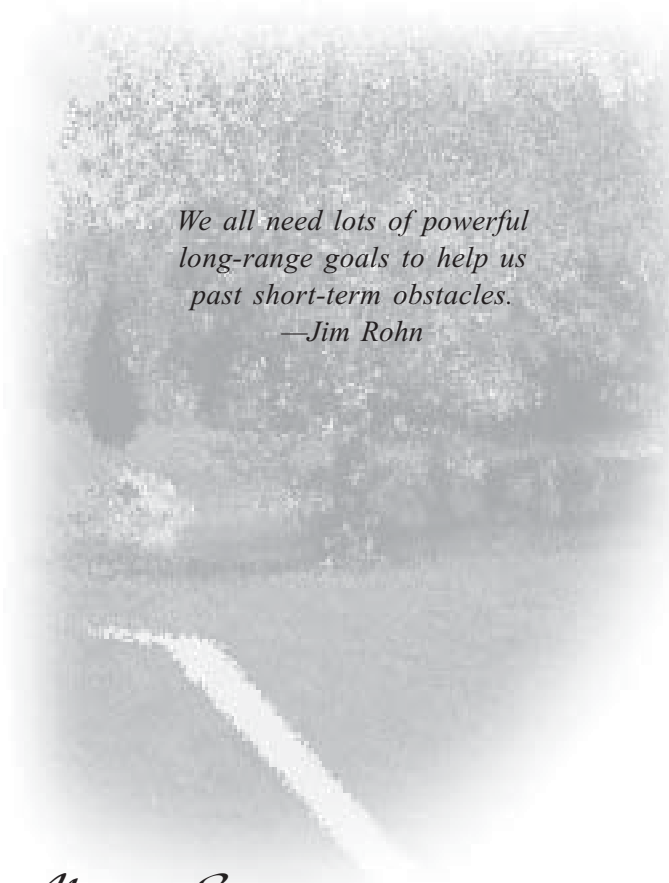
Technology Plan Foundations

To build a solid foundation for a technology plan, the following should be placed at the beginning of the planning document:

Goals—State specifically the plans to accomplish the goals.

Objectives—In measurable terms, explain how you plan to achieve the goals stated.

Philosophy—A school's philosophy should include making preparations and plans to accomplish established goals and objectives. Goals must be established to envision the future of the technology plan. Teaching transferable thinking skills is important in preparing students to adapt to a changing environment. Each student should be furnished written objectives that detail specific competencies that may be achieved through participation in the educational process. In order to create a vision that encompasses the entire community, the vision for the technology plan must be written in broad terms. The reason for inclusion of this section is to help a school determine and place in writing the technology-oriented philosophy.



Mission Statement

A mission statement defines your purpose, plans, and performance in fulfilling the vision outlined by the planning organization. This component is strongly recommended to be included in all technology plans. When creating a mission statement, consider the following:

- What must be achieved to make our vision a reality?
- What must be achieved to develop, implement, and continually improve the quality of instruction, learning, and use of technology?
- What are the priorities of the institution related to technology utilization?
- What are desired user benefits and advances?
- What qualities characterize the institution's technology users?
- How can the *application* of the tool be taught rather than just the tool?
- How can the goals and objectives set within the technology plan be achieved successfully?

Data Collection, Analysis, and Reporting

Consider starting the data collection process with students and teachers as end users of instructional technology. This should aid in discovering how to apply technology to their specific working conditions. This concept should also apply to other personnel working within the school jurisdiction. A survey using open-ended questions can be useful for this purpose. Data are likely to be utilized in a variety of locations within a technology-planning document. Data are necessary for many reasons. Some of these reasons include:

- Describing the current status of programs, courses, technology, infrastructure, and other situations that will be changing continuously
- Determining the needs of clientele, identifying standards, and uncovering new problems and opportunities
- Formulating and fine-tuning values, visions, missions, and goals
- Deciding how to fulfill needs, implement planning steps, and accomplish specific objectives
- Controlling the planning process, evaluating results, and revising plans

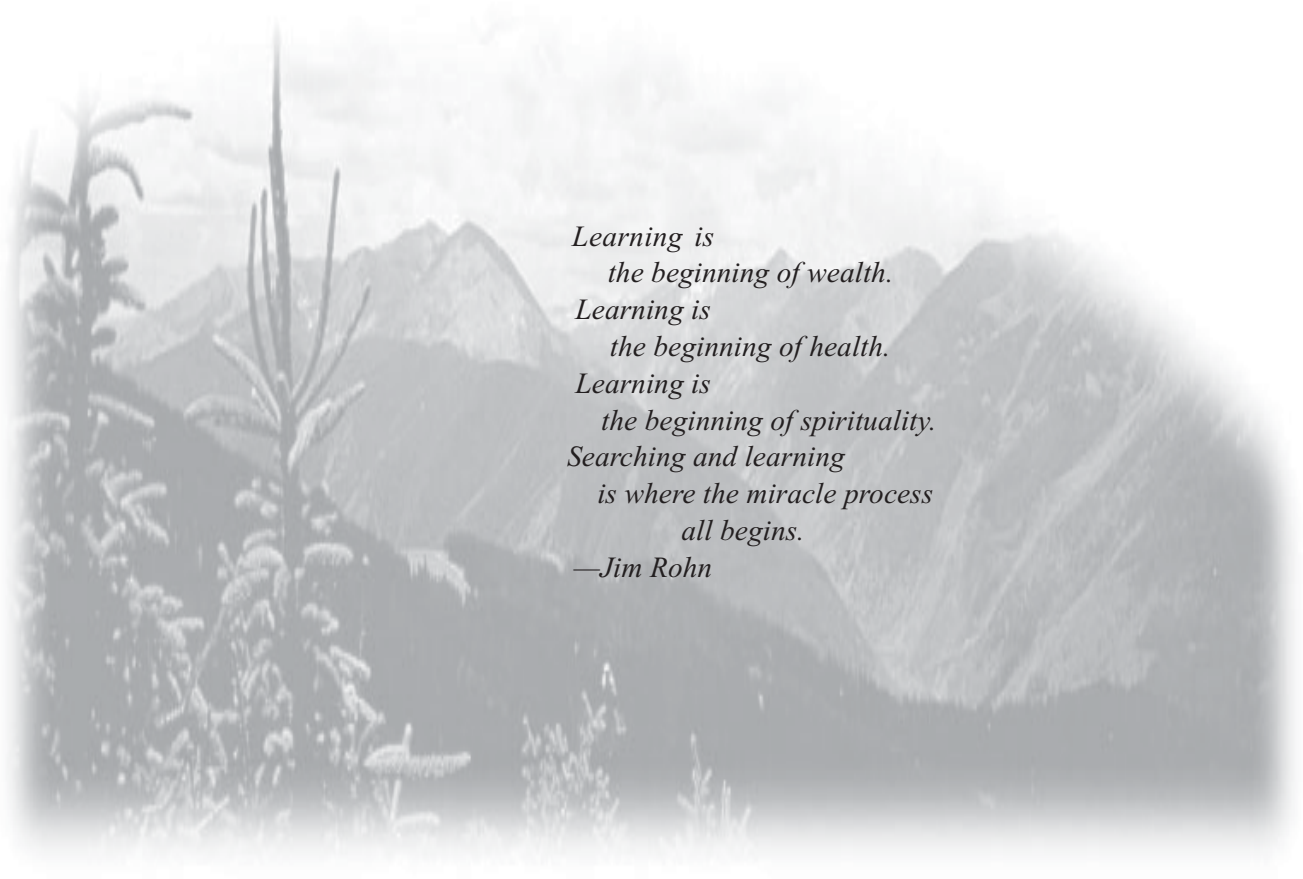
Data may be of many types, for example: demographic, descriptive, subjective, and objective. Many avenues, therefore, may be used for data collection. Existing records, surveys, field observations, and physical measurements may be used to determine attitudes, abilities, personal characteristics, processes, curricula, equipment, finances, and many other components important in the planning process.

Data may be analyzed by a variety of analytical, graphical, and holistic techniques. The types of analyses employed will depend on the data collected and the questions to be answered. It is advisable to obtain the aid of a skilled researcher or evaluator.

Interpretation of the data is as important as *collection* of the data. Periodic reports throughout the planning process will be necessary. It is important that reports be accurate, clear, and concise. Place tabulations and lengthy lists in appendices. Reports should be tailored to the reader. An interim report to the district superintendent should look very different compared to a technology newsletter for parents.

When collecting, analyzing, or reporting data for evaluation, several considerations are important:

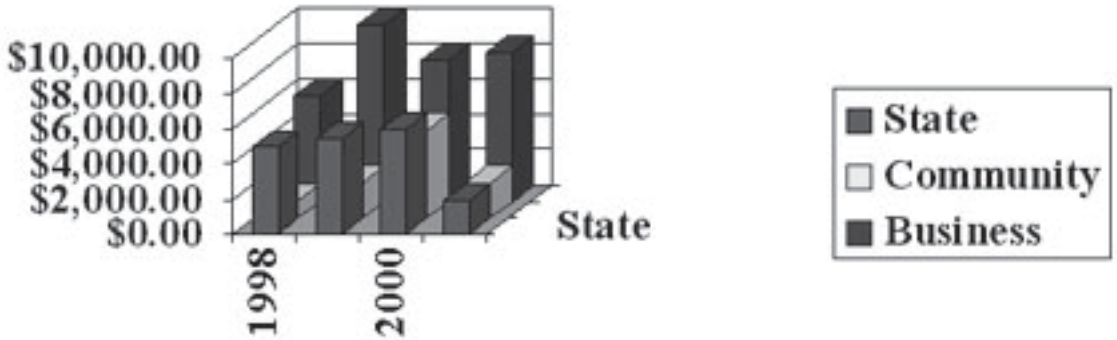
- Understand the purpose of data before beginning data collection.
- Collect only the specific data needed.
- Collect data on a voluntary basis.
- Maintain confidentiality of respondents.
- Do not use data to prove a preconceived idea; use data to discover, describe, and provide other information necessary for decision making.
- All techniques should be sensitive to bias and diversity issues.
- Keep surveys and other related materials short and easily interpreted.
- Avoid questioning that could lead to preconceived answers; open-ended questions are generally best.



Learning is
the beginning of wealth.
Learning is
the beginning of health.
Learning is
the beginning of spirituality.
Searching and learning
is where the miracle process
all begins.
—Jim Rohn

Budget

The budget shows allocation of available funds and their sources. Purchases and other expenses incurred during implementation of the technology plan are included. This information could be displayed in chart form showing budget breakdowns and total costs, and may be included in the appendix. This section may include a narrative justification or explanation of various components in the plan. A comprehensive plan will indicate, in its budget section, how financial support is provided for the full duration of the plan's life.



Critical Issues

Numerous critical issues exist in planning for pragmatic use of technologies. An effective strategy in preparing the sections of the plan dealing with these issues is to assign each one to a committee member. Assign a special task force to each issue, and then let the committee member focus on a specific area. As the task force gives periodic progress reports, the entire committee can stay abreast of overall action. Sample issues to be considered in writing a plan can include, but are not limited to the following:

Legal Aspects

Legal aspects can cover a multitude of areas from pirating software to insuring that a state or district's technology curriculum is achievable. Several legal factors should be considered and implemented in the development of a technology plan. These factors include, but are not limited to the following:

- Make sure ALL staff understand the copyright laws, especially regarding technology-related materials. Some of these materials include Internet sources, graphics, original HTML design, and software.
- Make sure the school is using at least the minimum specifications for technology. In some states of the United States, violation of these standards could cause loss of accreditation.
- Consider an Acceptable Use Policy (AUP) to guard against such erroneous, damaging behavior as e-mail harassment, theft of electronic materials, and access to pornography and other "hate" materials. Some schools take the approach by referring to the policies as Responsible Use Policies (RUP) rather than Acceptable Use Policies, because they would rather have something **responsible** than something **acceptable**. Exercise caution when installing Internet filters of restricted materials. Either have an AUP/RUP **OR** Internet filters, not both. (Some legal experts/authorities in the U. S. have indicated to NCTP that one of these may negate the legality of the other. The real test may come when the Supreme Court hears a case. Until then, err on the side of caution/reason. For background on this, refer to the landmark Supreme Court case, *Tinker v. Des Moines Independent Community School Dist*., 393 U.S. 503 (1969) (USSC+))
- Develop seminars to train employees on "Netiquette" for using electronic media.
- Identify individuals who are responsible for securing software and equipment in laboratories. Make sure that they can be held accountable for failure to secure these items.
- Outline what sanctions will be taken for failure to abide by the established policies. (**Caution:** A danger here is to make these too negative. We want to encourage people to "do right" rather than building barriers of negativism.)

Everyone is encouraged to conduct research that will determine what "acceptable use" strategies have been successful in the implementation of technology. Be aware that administrators and coordinators are responsible for laying out policies for using electronic media and those individuals should take the proper steps to make faculty/staff in the school aware of those policies. Legal aspects are designed to protect users of technology, not to harm or punish users of technology.

Community Resources

Resources do not always refer to money, but also may refer to time, labor, knowledge, materials, and equipment. Use the resources available within the community. Some of these resources include:

- Ask a company to donate the materials and labor to rewire buildings, etc.
- Instead of paying a consultant or trainer's fee, ask a representative for an industry if they have someone who can do it for free.
- Ask industry or knowledgeable individuals to undertake the task of physically setting up and putting equipment on-line. Consider sending school representatives to learn by watching and helping.
- If your plan calls for extra lab time after school or in the evenings, ask for volunteers to facilitate the lab. This may ease a teacher's workload.
- Conduct brainstorming sessions with community members to discover some resources your community can contribute.

Public Relations

The development of public relations is the process of communicating strategically with the individuals who are important to the ideas, visions, and goals of the school. Just like any other product, a technology plan is being sold to the individuals in the community by developing activities and policies that will create interest in your proposed plan. Public relations programs can be elaborate and expensive, but they do not have to be expensive to be effective. There is no correlation between the amount of money that you spend and the success of your technological program, because the success of public relations depends more on what is happening with an institution and the public relations effort.

When developing a public relations agenda to promote your technology plan, the following may be considered.

- Determine the key audiences.
- Consider the demography of your community in determining what public relations tactics to use. Tactics involved in executing a public relations program are virtually unlimited. They include standard news releases, media liaison, press tours, and so forth, but can include direct mail, special events, contest, and speakers' bureaus. The criteria for evaluating the appropriateness of a public relations tactic include.
  - √ Will the tactic support the overall strategic objectives?
  - √ Is the key audience targeted?
  - √ Will the tactic influence the members of the respected community positively?
  - √ Is its cost justified by its potential effectiveness?
- Identify other groups that may have a significant impact on your ideas: employees, the community, government agencies, businesses, non-profit organizations, educators, etc.
- Determine what type of media, such as trade and technical publications, business press, television, radio, newspapers, magazines, and the Internet, will best target and influence your selected audiences.
- Identify key contributors in the community by determining what individuals or groups support your institution.
- Formulate a strategic message to target audiences. Put together a plan outlining objectives, strategies, tactics, timeline, and budget.

Remember that strong public relations illustrate the needs and goals of the institution and create a desire for implementing technology. Individuals will likely support your goals and visions when they are offered a chance to voice opinions and gain knowledge of the plan to be implemented.

Support

Support is the provision of tangible or intangible appreciation, motivation, or rewards for an idea, a situation, a product, or a person.

Everyone involved in the planning process is expected to and should provide some sort of

support, depending on his/her role and/or position, in order to gain and maintain the maximum support possible. Support includes, but is not limited to, the following: state legislators, school district leaders, schools administrators, teachers, community members, and students.

Support must begin with the birth of the technology plan idea, maintained through the process, and nurtured for an endless period of time. When providing support, the following should be considered:

- Financial support to purchase hardware and software
- Financial support for the infrastructure
- Professional development for faculty and staff members
- Provision of incentives to teachers who participate in inservice training programs
- Elimination of teachers' routine tasks in order to have more time to help peers and students
- Provision of technical support to maximize the use of the hardware and software
- Provision of consultation and advice for safety and related legal issues

Funding

When developing an effective instructional technology plan, a committee should remember the importance of funding. The first step is to look at the school district and to assess the need. The dollars allocated should be shown as an investment rather than an expenditure. With both investments and expenditures, there is an initial outlay of dollars. However, with investment one gets back much more in return than the initial outlay. With an expenditure, one may never see the results of the outlay.

There are various concepts that can be addressed regarding funding:

- Budgets should be a technology line item to indicate that support for funding is an ongoing process.
- Financial offers need to be involved in the funding process.
- Communicating your needs and your willingness to the commitment develops a foundation for other donations.
- Corporate or private donations of equipment, service-staff training, and technical support can provide some of the most beneficial, long-term funding assistance possible.

There are alternative techniques or strategies available in the funding process:

- Fund-raising activities
- Rent-a-student programs
- Sale of outdated technology equipment
- Partnerships with outside organizations via exchange feedback about the product application
- Money accessed through textbooks/ curriculum materials funds or improvement of facilities funds.

Partnerships with Businesses

To achieve ideal educational opportunities where real-world situations are to be taught, educational institutions cannot operate independently from the industrial community. For this reason, businesses involved with technology within the institution's community become a viable source for information and services that are unattainable in a classroom environment. A partnership with businesses must be created with bilateral communication, planning, and implementation. When creating partnerships, some of the following questions may need consideration:

- Which businesses in the community are available for partnerships?
- What technological goods or services can

those businesses provide to the institution to promote a more involved educational atmosphere?
- What can the institution contribute to the business to complete the partnership (this is a matter of prime importance)?
- Who will be the ambassador for the institution to initiate corporate partnerships?

It is vitally important to identify what the institution can give back to the corporate community. This needs to be accomplished before an initial plan is presented to any company. Often a business will be more cooperative if they know, up front, how they may benefit from a partnership.

While most businesses offer partnerships with the best of intentions, it is wise to exercise a little caution when receiving goods or services from a company. These questions can help identify any problems that may occur in such a situation:

- Are any strings attached with the accepting of these goods or services?
- Might there be conflict of interests involved?
- Have the value and quality of the goods or services been verified from an independent source?

Finally, the continuation of partnerships must succeed if the businesses are to support the ongoing cycle of the institution's technology plan. This can be achieved by providing the opportunities to incorporate students into the businesses' workplace through after-school studies and summer internships. The business may choose to hire some of these students after they leave school. Graduates of an institution might be more inclined to continue to help their former school than someone who had no association.

Facilities

Facilities relate to anything needed to house or power the chosen technology equipment. When planning for facilities, consider the following:

- Location
- Buildings
- Rooms
- Wiring codes (example: In older buildings, can existing power boxes handle the additional power needed to run the equipment?)
- Data lines
- Security
- Fire codes
- Panic buttons
- Authority
- Physical layout and proper design
- Furnishings
- Climate/conditions

Community Involvement

Community involvement is described as the interweaving of the best efforts of both the community members and the educators to produce the highest quality environment, equipment, and facilities available for the education of our youth—our greatest natural resource.

When planning for the development of community involvement, the following points may be considered:

- Discuss with community members how education has changed and how technology can play a positive role in transforming learning.
- Involve parents, grandparents, and community members making them aware of the technology being used in the schools, by having Family Technology Night.

- Invite civic clubs to meet in the computer labs and have students show club members how to create electronic presentations.
- Invite the Board of Education (or other appropriate governing agency) to a hands-on, state-of-the-art learning workshop. The students can guide them on their first trip down the information superhighway.
- Invite business leaders and corporations to the school for Business Technology Night. Students can design advertisements, tri-fold brochures, and electronic presentations for the various adopted businesses.
- Try to involve the local businesses by asking them to allow some students to work in the afternoons or in the summers.
- Invite the local businesses to a technology-planning meeting and get them involved in the planning process. Maybe they will donate time and money to your school.
- Find out from businesses what kind of employees they are looking for in the future, so your school will know how to prepare the students properly.

Implementing the previous suggestions will accomplish the following:

- Form a bond between civic organization members and students
- Promote a community spirit
- Promote lifelong learning
- Encourage funding from corporate sponsors
- Promote pride in the school
- Promote real-life application of skills learned in the classroom
- Encourage the use of the latest and highest quality technology available
- Give students hands-on experience
- Allow businesses to see what students will be able to handle on the job

Networking

A network is a collection of interconnected, individually-controlled computers bound together by the hardware and software used to connect them. A network allows users to share their data and resources. In order to provide equitable access to information for administrators, teachers, students, and parents in a state or province's educational system, there must be a system-wide information network. This network must integrate data, voice, and video and must extend to every school district and library. An effective system-wide network will provide:

- Distance learning that enables students in rural areas to receive the same quality and breadth of courses as their peers in metropolitan districts
- Ongoing (inservice) instruction of teachers that is conducted without requiring teachers to travel
- An educational opportunity via distance learning technology for professionals in the target market
- Global connectivity to enrich the learning environment by allowing teachers and students to access leading libraries, access remote information sources (databases), and converse with other students and colleagues

An effective technology plan must be based upon an underlying infrastructure, the key component of which is networking. This element of the technology plan should encompass all local area, (i.e., intra-building) and wide area (inside and outside building) networks and the associated interconnectivity equipment and network operating system necessary to implement a fully-networked computing and information technology environment.

Networking must be considered an essential part of technology plans. This element of a plan may be an advanced telecommunication system that provides the necessary electronic communication capabilities at all levels, from the classrooms, buildings, and districts, to the world. This system will provide two-way interactive data communication (Distance Learning), Internet connectivity (i.e.,

network, electronic mail, File Transfer Protocol, World Wide Web), and voice-based information service. Distance learning/education is just one of a myriad of activities that can be enhanced and supported by a robust telecommunications network.

Furthermore, the networking and the interconnectivity component of the technology plan must be designed and implemented so that they are capable of meeting the needs of the school, district, and state/province in the near future. In the planning of a network, the following may be considered:

- Intra-building and inter-building connectivity
- Network hubs, switches, routers, and other electronics
- Local Area Network (LAN)
- Wide Area Network (WAN)
- Frame-relay connectivity, as well as other connectivity/infrastructure solutions
- Distance learning opportunities
- Television distribution

- Satellite delivery
- Network operating systems and protocols
- Electronic bulletin boards
- Internet Service Providers (ISP)
- Online services

Finally, all computer systems may be exposed to viruses, which can infect any form of transferable media. These viruses can be transferred across networks via hard disks, floppy disks, tapes, optical media, email, etc. Preventive measures must be taken to protect against damage caused by viruses. Also, procedures should be created to cleanse infected systems.

Note: It is not the purpose of this portion to educate the planner or the committee about networks—many books and other resources exist to do that.

Special Needs Learners

Technology is an excellent tool that students with disabilities may use to access learning. When developing a technology plan one must provide for special needs learners. While the main focus may be on the disabled, the plan must also provide for learners who are classified as gifted or talented. The Americans with Disabilities Act of 1990 requires that all private and public schools, libraries, businesses, and facilities are accessible to people with disabilities. Of course, schools will comply with the mandate of reasonable accommodations, but they can do much more if they become familiar with the variety of disability categories and research the adaptive technologies that are available to assist in overcoming these disabilities.

The following are a few examples of why special needs learners must be considered when planning a technology program:

Visual Impairments

Visual Impairments can include students who are partially sighted or have low vision, as well as those who are blind. Problems include inability to see the screen, orient on the keyboard, read the computer printout, and the inability to write and read printed information. Adaptive technologies include:

- Speech synthesizers and digitizers
- Large monitors
- Talking computers
- Braille embossers and printers
- Scanners and scan-reading software

Physical Impairments

This can include students who have limited or no use of their bodies and who experience difficulty in writing, holding books or papers, and turning pages. Adaptive technologies include:

- Voice recognition systems
- On-screen keyboards
- Enlarged or mini keyboards, trackballs, joysticks, and Morse Code sip and puff switches

Hearing/Speech Impairments

Generally, students with hearing and speech impairments have little difficulty using computers, but they can still benefit from emerging technologies which include:

- Communications software which displays dialog on computer screens
- Speech output devices
- Visual displays and printouts

Learning Disabilities

Some disabilities that affect learning include dyslexia, dysgraphia, dyscalculia, language deficit and attention deficit disorder. Adaptive technologies are available to enhance the learning capabilities of students with learning disabilities. Two software packages appropriate for students with learning disabilities are *Write Out Loud* and *Intellitalk.*
When planning for technology, consider that students with special needs will also benefit greatly from using technology such as educational software and the Internet. For example, software packages for students with severe/profound disabilities include *Board Maker, Overlay Maker*, and *Intellitools*. There are many more technologies available than the adaptive technologies listed previously to aid in curriculum and instruction for students with special needs.

Exceptional Students

Students who are recognized as gifted and/or talented create yet another challenge for schools. Educators want students to expand their knowledge base and to develop creative and complex thinking processes, while challenging them to realize their full potential. Technology can be used in a variety of ways to improve the curriculum for talented and gifted students. Access to the Internet can bring enormous resources into a school including, but not limited to:

- Weather maps and forecasting
- Astronomy and geography
- Electronic publishing and on-line technology
- Music, the arts, and literature
- On-line discussion and news groups

Programs of enrichment and acceleration usually involve the greatest amount of curricular adjustment, but they also have the greatest effect on student learning. Evaluations show that students enrolled in accelerated classes outperform non-accelerates of the same age and IQ by almost one full year on achievement tests. All this information compels the planner to seek to create and maintain robust, expansive programs that challenge all learners. This allows every student the privilege of exploring learning vistas, regardless of personal disability or gift.

Lifelong Learners

A Lifelong Learner is an individual who has realized that the importance of education and technology will always change the way they accomplish their life goals. People's goals change as they experience life and society. Naturally then, people's needs for education will shift over time. Not only is this natural, it is desirable and wholesome.

Technology planners are encouraged to accentuate that becoming a lifelong learner does not actually mean that they should pursue only education and research. As the planning committee addresses the

issue of lifelong learning, many wonderful and exciting ideas will emerge that demonstrate a myriad of ways that community resources can support the dynamic concept of lifelong learning. Technologies coupled with creative people can serve an extremely important role in this area.

Fine Arts

The fine arts curriculum in the past has often been treated as an optional rather than an essential part of education. With the establishment of the "Goals 2000: Educate America Act," the arts is acknowledged as a core subject and as important to education as English, mathematics, science, foreign languages, civics, government, economics, history, geography, and other traditional "subjects." Teachers can use technology to enhance both the creation and the understanding of all areas of the fine arts, including movies and animation. Some points to remember when beginning this enhancement are:

- Use of multimedia aids learning.
- With the use of multimedia development tools, students can learn through construction of their own projects.
- Examples of the use of computers, scanners, camcorders, printers, and any new technologies that allow for exploration and creative design include the following:
  - √ Students can capture, process, and manipulate words and images using various software programs.
  - √ Students can compose, revise, edit, and print music using a MIDI (Musical Instrument Digital Interface) instrument connected to a computer containing composition software.
  - √ Students can explore all areas of the arts using CD-ROM disks: styles, periods, artists/composers, and cultures.
  - √ Students can visit museums around the world or participate in a worldwide art exhibition of student art.
- Interesting and engaging technologies can intrigue a student, but it is only through instruction, study, and practice that a student becomes competent. With increasing levels of competence a student becomes more empowered and productive.
- Students need to be well guided toward choosing, compiling, and arranging materials appropriate to specific artistic ends.
- Success is measured by how well students achieve artistic and intellectual objectives, not by how adept they are in using a certain technology.
- Teachers and students can use the Internet as networking tools to discuss art-related subjects and events.
- Creative and continual utilization of community resources is a good means of exposing students to the arts. Three examples are:
  - √ Partnerships with area arts organizations can be developed.
  - √ Teaching alliances with art specialists can be formed.
  - √ Consider grants funding via arts organizations.

The Use of 3-D Graphics Technologies for Learning and Instruction

During the past few years, one of the most important developments in the fields of computers, electronic visualization, and telecommunications is the application of 3-D-graphics technologies to the delivery of information and the facilitation of learning. Some of these technologies are able to describe 3-D objects very accurately, and combine them into scenes and virtual worlds. Also, they can be used to create interactive simulations that incorporate animation, and allow for multi-user participation. An advantage of using these newer 3-D graphics technologies for instruction is that they are able to describe objects from many different points of view. 2-D images, on the other hand, are typically flat and can only be seen from one point of view.

Currently, some 3-D technologies are being applied to change the actual interface metaphor on Windows-based desktop computers, which typically only allow for single user interaction in 3-D interface metaphors. In the future, however, these newer technologies will change the look of computer desktop interface metaphors to that of three-dimensional spaces where many people can interact concurrently.

It is important to consider the use of new 3-D graphics technology for learning and teaching. In addition, new software supporting 3-D graphics technologies can be used by teachers and students to create their own 3-D learning environments. 3-D graphics technologies are being added rapidly, as the design of educational environments expands, so it is important to learn how they work best to support learning and teaching. Therefore, before purchasing hardware and software, evaluate various 3-D graphics solutions.

Implementation

Implementation as a part of the plan document answers the questions when and who is responsible for acting on the plan. This component can outline and include:

- The estimated timeline or proposed schedule for completing the various components of the plan
- The necessary steps involved for completing each component
- The person(s) responsible for each component and seeing that each step is completed at all levels of involvement
- Checkpoints for formal evaluation of implementation
- Relevant funding information (how much and when it will be available) or where to find this information
- References to the incentives proposed in the Technology Professional Development section of the plan

Technology Stewardship

The idea of technology stewardship consists of taking responsibility for the best management practices of the resources entrusted to the organization. In addition, it is the idea of using the technology resources in the most efficient and effective manner to receive the most benefit and use from such resources. Some examples of these best management practices include, but are not limited to:

- Using electronic means to communicate information to others in order to reduce the amount of paper used
- Recycling toner cartridges from the printers, fax machines, and copy machines
- When the toner cartridge gets low, taking it out of the machine and shaking it to redistribute the toner and then putting it back in the machine. You will extend the life of the toner cartridge
- Recycling paper and using recycled paper
- Using disks to save and check the majority of work to keep from printing so much
- Turning off machines and lights at the end of the day or when they are not being used
- Using screen savers or turning off your monitors when not being used to eliminate excessive output of energy, heat, and radiation
- Cleaning monitors, keyboards, and mouse devices on a regular basis
- Prohibiting food and drink around equipment
- Forming a brainstorming committee consisting of members of the school. These individuals will work toward developing additional best management practices specific to their particular site
- Performing regular service checks on equipment to insure everything is working correctly all of the time (this will save on large repair bills later)

- Controlling usage of the equipment by having a monitor present at all times while students are working
- Teaching students and staff how to take care of the equipment and who to go to if something does go wrong

Equipment

Choosing hardware should come after deciding curriculum and looking at available software. When choosing equipment, the following questions should be addressed:

- What is the expected life span of the equipment?
- What will be the budget (currently—and in the long-run)?
- What instruction will be necessary for staff/ students?
- What functions and capabilities must the equipment possess?
- What will be the minimum specifications for the equipment?
- Is the equipment compatible with existing equipment within the school, or will the new equipment replace the existing equipment?
- Is the equipment in question compatible with equipment possessed by other schools attempting to conduct interactive sessions?
- Is the equipment user-friendly?
- Is there an equipment replacement plan and/ or maintenance plan?
- Are upgrades planned for?

When preparing to evaluate software, the following questions may be considered:

- What software is in use currently?
- Can vendors give demonstrations of currentv technology?
- How does the software meet curriculum objectives?
- How long will the software meet curriculum objectives?
- Has the Software and Information Industry Association been consulted as a resource? (See appendix for web address)
- Is the software user-friendly?

New and Emerging Technologies

Technology is changing constantly. Therefore, a technology plan should be flexible and encourage the use of technology that has yet to be accepted widely.

- Investigate and research to see if your current technology is up to date. If not, salvage what you can, scratch the rest, and start over.
- Create a plan and purchase equipment that is able to change as the technology changes.
- Ask for volunteers or possibly assign several people who are interested in emerging technologies to report every so often on areas they think need to be addressed in the school or institution's technology plan.
- If you cannot afford to buy new equipment as it comes on the market, ask around and locate someone who would demonstrate new technology to your school or institution.
- Encourage staff to attend state, regional, and national technology meetings so that they may keep up to date on technology.
- Encourage staff who attend technology conventions to present their findings to the committees when they return.

Purchasing

Purchasing is the process that involves researching, comparing, and buying equipment.

- Everyone involved should research the state regulations for purchasing equipment and software. Know the rules!

- Unless taking a certain bid is required, do comparison shopping in order to get the best equipment for the least money. Don't be afraid to ask for donations if the rules for the state allow them.
- Research, research, research! Never purchase equipment without first knowing what is going to be done with it. Purchase according to needs, and don't waste money on equipment that will only collect dust.
- Consider who will be responsible for maintenance of the equipment and the costs involved. Also study all warranty information included.
- Make sure software and hardware purchases meet and preferably exceed minimum standards set by the state.
- *"The bitterness of poor quality is remembered long after the sweetness of low price has faded from memory."* –Aldo Gucci

Security

By providing security you are protecting your computers, networks, personnel, and software from destruction, misuse, and harm. In providing security, there are many areas that you should consider high maintenance areas, such as: security of data, personnel, and facilities. Every security plan should be unique in developing its strategies for dealing with security.

When developing a security plan, the following questions may be considered.

- Why do you need security?
  - √ People Threat (human error, dishonest employees, disgruntled employees, and hackers)
  - √ Physical Threat (fire damage, water damage, electrical outages, vandalism, viruses, earthquakes, and tornadoes)
- Are budgeted funds sufficient to provide and sustain the type and level of security program you desire?
  - √ Will budgeted funds be continuous?
- What type of computer security will be provided?
  - √ How will the staff, students, and community members access computers?
  - √ Will passwords be assigned?
- What type of network security will be provided?
- Should you have a Standard Operating Procedure (SOP) for handling security problems?
- Where should security systems be installed?
  - √ Do you need security in each room?
  - √ Do you need security in each building?
  - √ Do you need cameras to monitor the facilities?

Maintenance

Maintenance may be defined as any repair or upkeep performed on equipment or facilities. A comprehensive maintenance plan is a necessary component of a technology plan. This comprehensive plan will ensure longevity of the equipment, adequate staff instruction, and budgets that are cost effective.

When developing a maintenance plan, the following points may be considered:

- Solve maintenance problems before they arise by keeping printers, computers, monitors, and keyboards free from dust, grime, and foreign objects.
- Develop a budgetary process to provide for ongoing repairs.
- Decide who should provide maintenance services, the user or the service contractor. If the user is responsible for these services, train people (possibly two or three from each school) to provide repair services. (e.g., computer teachers, administrators, and frequent users)
- Provide regular updating sessions for personnel in order for them to stay abreast of current practices and techniques.
- Consider asking qualified and trustworthy persons such as parents, industry, business,

or community residents if they would offer to repair and maintain equipment for free or at a reduced rate. (e.g., Partnerships with Businesses)
- Arrange printers, scanners, copiers, and other peripherals so that they are accessible for maintenance.
- When purchasing classroom equipment, consider asking for a contract that includes a warranty package and provides special training.
- Examine maintenance contracts carefully and be alert for any hidden costs.
- Know what is covered in the contract, such as coverage of equipment damages by neglect or normal usage.
- Maintain a maintenance/problem log on each piece of equipment for reference when requesting maintenance (e.g., date of service, who performed the service, next service date, equipment problem, what was done to solve the problem, and cost).
- Monitor all classroom labs to prevent maintenance problems.
- Train students to perform minor repair functions (e.g., printer jams, computer lock-ups, and mouse malfunctions). Students are becoming amazingly adept at locating and repairing a wide variety of technological services and networks—they may be one of your very best resources.
- When purchasing computers, purchase extra equipment to keep in a box in case of an emergency (e.g., mouse, internal computer parts, and keyboard).
- Repair technologies as expeditiously as possible.

Professional Development

Professional development is required to become more efficient and effective in technology planning. How can everyone be taught how to use technology effectively if the producer of the product is not efficient and effective? Professional development strives for continuous improvement of quality.

The statement has been made that you train animals and develop people. Professional development must continue to stay abreast of the continuously changing world. When individuals are not motivated to participate, they quickly lag behind and take their students with them. All professionals should be required to continue professional development to continue to be more efficient and effective in producing quality students.

The technology awareness and skills instruction phase provides learning opportunities through workshops or conferences for all personnel of an institution.

To prepare for a commitment of continued professional development:
- Conduct a staff survey to establish needed areas of instruction.
- Results of the survey will identify specific equipment and tools for technology instruction, for example: computer networks, distance learning, CD-ROM, zip drive, scanners, digital cameras, videodisc, personal computers and computer modems, and different types of projection technology.
- Identify and make provisions for the availability of appropriate technology instruction.
- Develop periodic opportunities for personnel attendance at professional development sessions and to allow choices to accommodate schedules for participants and attendees.
- Document time spent for professional development. This information could be important for acquiring research-funding opportunities and for proving a high quality professional staff. This information could be stored in a database system for official documentation of progress in individual development.

- Funding for reimbursement of personnel could be allocated in some type of an annual budget process or through some type of awards system for accomplishment of identified instruction.
- Hiring a full-time professional development instructor who is not a "techie," but one who understands and has experience how to utilize technology in education.
- Develop a program in which teachers conduct research, and then facilitate a workshop as a result of the research.
- Develop an audit system of individuals to insure progress is being made in identifying and improving deficient areas of technology knowledge. A checklist could be developed easily following the survey to monitor individuals in completing this process to meet quality requirements of professional development.

Incentives/Reward System

Incentives should be given to administration, faculty, and staff as motivation to continue to learn and implement higher technology skills. Rewards can be "compensation" that personnel at all levels receive for carrying out these objectives. Congratulate and celebrate technology learning achievement.

- Plan your budget so that money is allocated for the incentive/reward program. Possibly sell or auction old equipment or put away a percentage of funds from special events as a way to pay for incentives/rewards.
- Make sure everyone is given a clear outline of what they must do in order to receive rewards.

Possible rewards include but are not limited to:

- A cash bonus
- Room supplies
- Extra time off
- Achievement certificates presented at meetings to recognize employee achievements
- Trips to conferences, etc. (to learn technology and/or present a successful program that is being implemented)
- Recognition for innovation and early adoption
- Articles to the local newspaper or in a district newsletter
- Technology equipment as a reward for learning how to use it
- Group discount for purchasing automation equipment for their home

Students should also be given incentives/rewards for learning technology. Possible rewards include:

- Field trips
- Extra technology usage time
- "Show your parents night" to show off special projects created with technology
- Achievement certificates presented at assemblies
- Discount coupons for local businesses

Curriculum, Instruction, and Evaluation

Curriculum is what is to be learned by students, instruction is the method in which curriculum is communicated, and evaluation is the process of determining if curriculum goals and objectives have been met.

Learning may occur in the absence of teaching, but teaching does not necessarily mean learning has occurred! One must keep technology in mind when developing curriculum goals and instructional and evaluation methods. Although the established curriculum, instruction, and evaluation do not necessarily have to change, integrating technology should enhance them.

Curriculum and instructional methods can be a dynamic process by exchanging ideas among

students, teachers, and others from around the world. The use of technology such as the Internet can provide many curriculum and instructional aids. Plan to incorporate technology into every aspect of instruction when possible. Also, when planning for technology, construct meaningful experiences that allow the student to see the importance of technology in everyday life.

When developing curriculum, instruction, and evaluation the following points may be considered:

- Establishing multiple objective areas such as cognitive, behavioral, and personal development
- Instilling the realization that learning is not confined to the classroom
- Developing life-long learning skills such as critical thinking, information processing, problem-solving, studying, decision-making, communication, and creativity
- Establishing global collaborative and cooperative learning experiences
- Developing instructional methods that meet individual students' needs, interests, and learning styles
- Developing instructional methods that allow students to express their individuality
- Allowing students to express, in multiple ways, the knowledge and skills learned
- Establishing a variety of evaluation methods that are not necessarily pencil and paper tests
- Creating opportunities for accessing "real-life information and experience"
- Establishing methods in which students can contribute to and improve society immediately rather than at some future time
- Utilizing simulations and modeling programs
- Establishing immediate and multiple feedback
- Developing multidiscipline and multicultural learning environments
- Instilling the realization that the responsibility of learning is shared by teachers, parents, students, and the community
- Developing curriculum and instructional methods which include multiple intelligences; for example, Howard Gardner's social understanding intelligence and Robert Sternberg's experiential intelligence
- Developing ways in which students can evaluate and assist others in learning
- Developing activities that are age and ability appropriate

Other Critical Issues

There are other critical issues that may be considered when developing a technology plan:

- Longevity of the plan
- Environmental Issues (conservation)
- Access/Equity to equipment
- Ergonomics (making equipment and furnishings user-friendly, e.g., table height, comfortable seating)
- Standards that the equipment must meet
- Communication between technology coordinators and technology users of the organization
- Desired effectiveness of the plan
- Planned obsolescence

Evaluation

To produce identified desired results, evaluation is a major step in reaching and identifying goals. Evaluation is a continuous process to acquire efficient and effective technology planning, and should be built into the planning cycle.

Each step in a plan should be evaluated. The type of evaluation and duration of the evaluation will depend on the step and the decisions that have to be made that pertain to that step. Identify the purpose of the evaluation for the intended audience.

Evaluation may also be addressed in other parts of a technology plan. Such sections may include implementation plans, critical issues, need analysis, and reporting. Even though evaluation may show up in these and other sections, evaluation should still have its own section to clarify evaluation purposes and procedures.

Bibliography

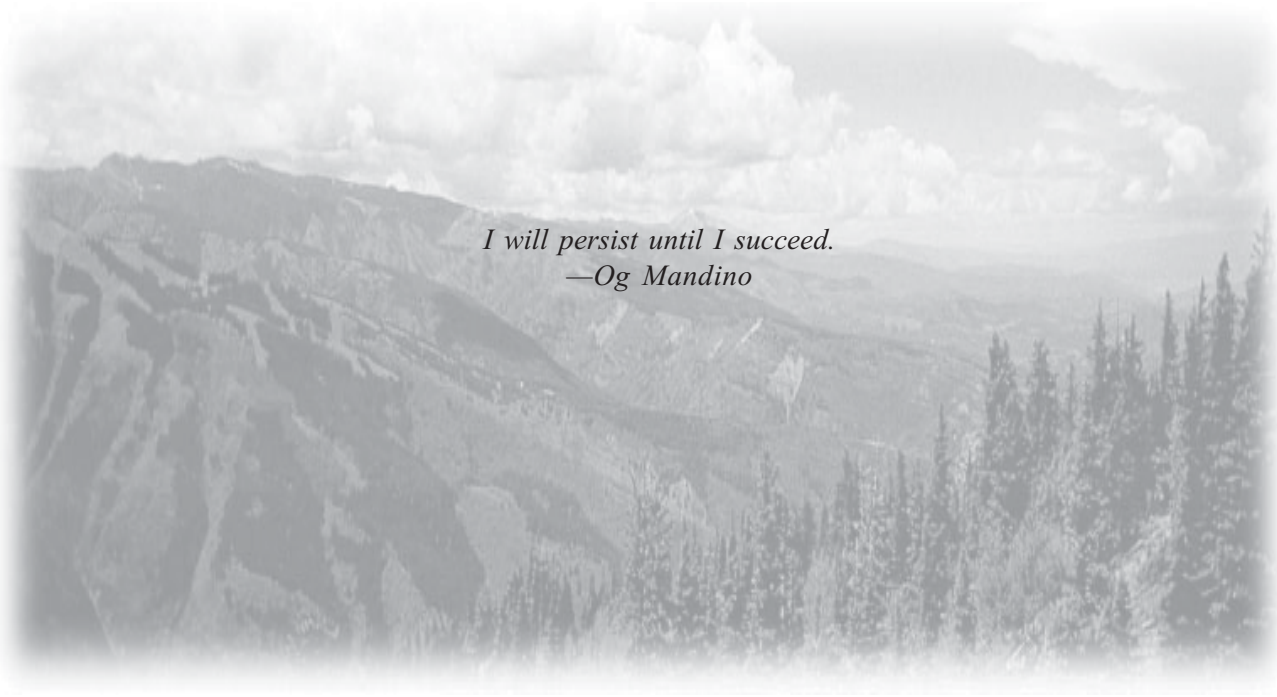
The bibliography is a collection of sources or publications that have been used to compile data, and that have been referenced in the technology plan (examples: books, periodicals, contacts, interviews, Internet sources, etc.). The bibliography should be prepared using a style that is familiar to most professionals (APA, Chicago, MLA, Turabian, etc.).

Glossary

The glossary is a list of any technical words used throughout the technology plan and their meanings. The glossary is arranged alphabetically.

Index

In the index, the reader of your technology plan should find an alphabetical ordered list of names, subjects, titles, etc., giving page numbers where references are made. The index is generally placed at the back of the plan.



Electronic Resource Appendix

These electronic sites can be used as resources to assist in developing a technology plan. These are only some of the available sites and excellent examples of the quality and amount of information that is available to technology planners through the Internet and other electronic media. ***Note****: These sites are available at the time of publication. Links may change or not work properly and servers may be unavailable for various reasons.*

National Center for Technology Planning
http://www.nctp.com

Equipment
Software and Information Industry Association (formerly, Software Publisher's Association)
http://www.siia.net
Digital Cameras in Education
http://www.ozemail.com.au/~cumulus/digcam.htm
SchoolComputer.com
http://www.schoolcomputer.com

Legal Issues
Internet Learning Partners: Children, Parents, and Educators Working Together (AUP)
http://www.global2000.net/schools/infoshare/ilp/aup.html
Southern Indiana Education Center: Acceptable Use Policies
http://mercury.esc.k12.in.us/aup/aup.html
Southern Indiana Education Center: Legal Issues and the Internet
http://mercury.esc.k12.in.us/aup/legalissues.html

Technology Integration
Community Learning Network
http://www.cln.org

Professional Development
Community Learning Network: Professional Development
http://www.cln.org/inservice/itpd/project.html

Educational Technology Sites
Milken Exchange
http://www.mff.org/edtech/
The George Lucas Educational Foundation
http://www.glef.org
The Global Schoolhouse
http://www.gsn.org
The Benton Foundation
http://www.benton.org
Apple Computer: Technology Planning Guide
http://www.apple.com/education/planning/
The School and Libraries Division (the "E-Rate" people)
http://www.sl.universalservice.org

