Guidebook

for Developing an Effective Instructional Technology Plan

Version 2.0

prepared by

Graduate Students at Mississippi State University

participating in
TKT 8763 – Seminar in Planning for Instructional Technology

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We respectfully offer this document to those who anticipate writing a technology plan in sincere hope that it will aid them in their task. We recognize this work as one that is "in progress." This guide is a product of our collaboration at the time of publication, May 7, 1996. We expect and desire others to critique, expand, and improve this endeavor.

The original guidebook was developed by students in June, 1995. This was an excellent work; however, several revisions were needed. The following authors, therefore, created Version 2.0:

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Preface

I am extremely proud of the document you are reading currently and want to offer a few words to help readers understand the significance of this work. This guidebook is a fluid document—it is in a constant state of change, of being updated. Such is the nature of technology planning.

The *Guidebook for Developing an Effective Instructional Technology Plan* was created by graduate students enrolled in my course, *Seminar in Planning for Instructional Technology*—a rich experience included in the Instructional Technology program at Mississippi State University. I have attempted to ensure that the activities in which these students engage are pragmatic and immensely beneficial. I used this assignment as a means of *immersing* students in the topic of technology planning. As a result, students learned a great deal more and a great deal faster than had I merely shared with them *my* views of technology planning—in the traditional mode of teaching.

No longer do I require students to write research papers that they submit to me as a partial requirement for the degree. In this scenario, student work would remain in the scrutiny of the professor; outstanding work of students would not be shared with their peers. Make no mistake, I still expect students to engage in sterling-quality scholarship. My standard of excellence in this area is extremely high (the students would probably roll their eyes and say, "Yes, to a fault!")—and students respond in a superb fashion to these high expectations.

The improved system I use is for students to perform individual and group research on well-thought-out issues, then to collaborate in the creation of materials that have universal application and are sought by hundreds of educators. Further, their work must be shared with the world, using a variety of technologies, but especially the Internet, generally, and the World Wide Web, specifically. Such a situation occurred with respect to this guidebook.

The majority of these contents were developed by my students. Only in a few cases have I added my own words or input directly. Naturally, since I have spent many hours engaging these marvelous students in discourse and debate, and have attempted to help them *think* more than just *remember*, I hope my influence appears, albeit subtle.

The guidebook was developed in response to needs voiced by educators around the world. Graduate students maintained rigorous contact with technology planners in a wide variety of locations and institutions. Email has been the primary mode of communication used; electronic redistribution of this guidebook seemed a natural delivery medium, therefore.

These extremely hard-working graduate students at Mississippi State are some of the most well-equipped planners on this planet. The entire world is their classroom. Using the Internet extensively, they have both taught and been taught by the brightest minds in existence—yours! They have probed deeply into sensitive issues, questioned exhaustively the premier leaders in government agencies and other policy-making

institutions, and stretched the minds of both energetically-willing and mildly-reluctant educators. As is the case with any eager learner, they have attacked this mode of learning with a vengeance; all of us who participated are better people for the experience. The fortunate few who have experienced this contagious synergy *firsthand* know the exhiliration that occurs and the concomitant frustration we sense as we see others who "don't get it." I am so proud to have been the single professor whose great fortune it has been to stand amidst these learners engulfed in the enterprise of intellect and exuberant, boundless creativity!

These students have critiqued hundreds of technology plans, most of which were contributed to the National Center for Technology Planning by people like you. They have designed many *devices*, or aids, for planning, and interacted frequently with a wide variety of schools engaged in technology planning. One result of all this activity is this guidebook. We hope you find it immensely beneficial.

As you read and use this guidebook, we encourage you to submit your comments, suggestions, and questions. It is through the regular exchange of ideas that we are able to improve the product.

Thank you to every person who has given so freely to the valiant efforts of my graduate students. Your input, advice, and dialogue has been invaluable. I feel sure, also, that you enjoyed interacting with the students and can understand why I derive such joy from working closely with them.

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Process

Technology Planning Model

PHASE 1
Recruit and Organize
Planning Team

Team members should be representative of all stakeholders and should be leaders who excel in planning, relationship, and communication skills.

PHASE 2
Research

Identify the technology needs of the individuals and organizations in your educational institutions, identify the technologies that can be applied to those needs, and identify how they can be applied.

PHASE 3
Construct
Technology Plan

Use what you have learned from your research to define your vision/mission and to define the goals and tasks that will lead to fulfilling your vision and mission.

PHASE 4
Formalize the
Planning

Articulate in a **document** what is believed, what exists, what is to be, and how goals are to be achieved.

PHASE 5
Continually
Implement
Evaluate
Revise

Introduction

This introduction outlines the concepts associated with the **process** of planning. Immediately following this introduction is a detailed discussion of concepts associated with the **product**—a technology planning document.

The Purpose of Technology Planning

Technology planning is an activity that provides direction and helps users understand clearly where they are now and *imagine* where they want to be. The most common technique used to formalize technology planning is the creation of a document. A technology planning document is to technology planning as a road map or a navigational chart is to a journey but the planning document is neither the journey nor the adventure. It is a device that helps explain the various points of interest and destinations to travelers involved in the process of realizing their dreams.

The purpose of technology planning is not just to produce a document, but to produce continuous action that creates and maintains a technology-rich educational environment. The plan (noun) is a clear, written description of the plan (verb) that is put into action by members of the community.

The Planning Process

Like a long journey, technology planning is long-term and continuous. There are discoveries about different routes to the same destination. There may be side-trips. Keep planning. Allow plenty of time (a year is suggested). Include all stakeholders in the planning process—students, teachers, administrators, community leaders, and other members of the community who will benefit from the implementation of the plan. Keep in mind that when the technology is in place and in use it should be transparent. The real purpose of technology in education is education.

Hint: Keep a log of council/committee activities for reference and as a resource for the planning document .

Consider the following:

- How best can we assess the present state of technology and future needs?
- How can we provide for ongoing evaluation and assessment?
- How often should the planning council/committee meet?
- What educational institutions that have already installed and implemented technology such as electronic classrooms can we visit?
- What conferences, expositions, etc. can we attend to discover more about our greatest potential in technology?
- Where can we find planning resources (people and documents)?
- How should we divide the planning responsibilities?

The Planning Document

A planning document is one physical outcome of the planning process. This guidebook presents key elements to consider in preparing the written portion of a technology plan. It is intended to expand a planning committee's familiarity with technology planning and related issues.

A good technology plan includes certain components. These components and related issues are presented in the order in which they generally appear in published technology plans. However, this does not imply that the order used in this guide is the best or the only possible choice. Likewise, not all components listed may be necessary for all plans; some plans will require additional sections not covered in this guide.

Please keep in mind that planning is a fluid, ongoing process. The written plan should be an articulation of what is believed, what exists, what is to be, and how goals are to be achieved.

Implementation in Progress

Implementation is a part of the continuous action that starts with the first technology planning decision. It begins the fulfillment of: 1) the vision, 2) the mission, and 3) the purpose of the planning process. It is ongoing and should improve as you evaluate your activities and revise your policies. As you initiate the implementation phase, consider the following:

- Always keep the vision and mission statements in mind as you progress toward your planning and implementation goals.
- Provide opportunities for everyone to be involved.
- Provide a flexible environment that nurtures change and encourages risk-taking to learn technology skills and use technology.
- Develop and maintain resource relationships with technology experts to be aware of emerging technologies.
- Do not panic if something is not going the way everyone thought it would. Reevaluate! Realize that you are involved in a process that requires constant monitoring and adjusting.
- There should be a definite schedule or timeline in your plan for carrying out the various phases.
- Someone must be responsible for implementing the plan in buildings and district-wide. (This could and should be more than one person.)
- Decide what motivational measures will be used to encourage teachers or administrators who are reluctant to carry out the program.

Ongoing Evaluation

Evaluation is a continuous, ongoing process. This process is both informal and formal. The informal component goes on in the planners' and implementers' minds as the planning and implementing process begins and continues. The formal component takes place at intervals throughout the process.

The informal is more intuitive; the formal can be done with established criteria.

In all planning processes some plans work well and others not so well, relative to various factors, including the planning and working environment as well as the people involved. A purpose of the evaluation process is to determine what is working for your institution and what is not, then revise accordingly. One public school system deliberately decided not to include a timeline or a budget in their plan. They also decided to report annually on progress in implementation, review, revision, monitoring, and evaluation.

- Revisit and revise the plan at least annually.
- Elicit feedback and suggestions continuously.
- Establish a feedback loop into the implementation process based on the vision and mission that is ongoing.
- Consider these questions:
    - What has been and is being accomplished? (implementation)
    - How can it be improved? (evaluation)
    - What is our next step? (revision)

Product

Cover Sheet

An attractive cover sheet is vital in providing that important first impression. Think of the cover sheet as the front door to someone's home. It should be sufficiently inviting, visually, that the reader is *drawn* to open the document and see what is inside. The cover should be enticing. Just imagine how much more appealing a magazine cover is when it is asplash with color and meaningful graphics than if it were bland—with only the title shown.

In developing a cover sheet consider the following:

- Utilizing different typefaces
- Inserting graphics
- Adding color
- Including the name of the institution for which the technology plan is designed

Title Page

An attractive and informative title page is an important component of a technology planning document, conveying a strong, positive message. In developing a title page consider:

- Including the state/province in which the institution(s) is located
- Including the date the plan was submitted
- Including who the plan was submitted by (not necessarily every name on the committee, but the name of the committee as a whole) (example: advisory committee)
- Including the superintendent (if applicable)
- Including an address and phone number for additional information
- Including the e-mail address or the web site address for a contact person in the institution

Table of Contents

The Table of Contents is a crucial component of a planning document because it provides a guide for readers. In developing the Table of Contents the following points may be considered:

- Including all sections of the document
- Being neat

- Being attractive
- Having page numbers so that readers can go directly to a certain topic
- Having appropriate indentations
- Including leaders (leader dots)
- Including headings and subheadings, if needed

Acknowledgments

An acknowledgments page provides the opportunity to recognize those persons and groups who have contributed their time, efforts, and resources toward the completion of the technology plan. While this section should be kept as short as possible, it should at least recognize those who provided financial support, leadership, technical expertise, review or editing of the manuscript, and the publisher of the finished document.

If the acknowledgment is for a specific person or organization, then that contribution to the plan should also be cited. If the acknowledgment 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. Consider ending this section with a general acknowledgment so that all supporters of the plan can feel that their efforts were appreciated.

Executive Summary

The executive summary serves essentially as an abstract of your technology plan. It provides the reader with a short overview of what the plan is, how and why it came into being, and what it hopes to accomplish. 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, and should communicate quickly the major points of the plan to the reader. A maximum length of two pages is recommended.

It is important when creating the summary to remember that, for many readers, the executive summary will be the only part of the plan that they read in its entirety. This means that the summary can be potentially the most important part of your technology plan for those readers as it will provide them with their only impression of it.

Vision Statement

A vision statement expresses your thoughts about what you want to happen in the future and should be written in broad terms. In preparing a vision statement, sufficient time, support, commitment, teamwork, and flexibility are required in order to convey a positive attitude toward the use of the technology. This component, with the mission statement, is the basis of everything else that you will do. It should be thought out carefully and included in all technology plans. When constructing a vision statement, consider the following:

- What roles do we desire and see for the future of technology and education in our institution and community?
- What will our classrooms of the future look like and include?
- How will instruction be delivered?
- How and at what levels will students achieve?
- How will the community be involved?
- What do we envision for our learners in the future?

Mission Statement

A mission statement decribes your purpose and your plans for fulfilling your vision for technology in education. This component should be included in all technology plans. When composing a mission statement, consider the following:

- What must we do to make our vision come true?
- What is learning, according to our definition?
- What does learning look like while in progress?
- What is different about learning with technology?
- What must we do to develop, implement, and continually improve the quality of instruction and learning using technology?
- What are desired student benefits and outcomes?
- What characterizes our learners?

Demographics

Demographics give the blueprint of the area surrounding the institution that will be implementing technology into its program. The demographics of a community or region contribute to the general quality of the learning experience.

Demographic data should cover all relevant aspects of the community/schools. This section is important as demographics may influence potential industrial and residential development. When developing a statement of demographic composition, the following points may be considered:

- Location
- Area
- Population distribution by ethnic group, gender, and median age
- Percentage of professionals, blue collar workers, unemployed, etc.
- General accreditation/degree levels of teachers
- Income: household and per capita
- Student enrollment, history, and projections
- School building distribution

Committee Membership

Every strong technology plan has several committees made up of key personnel. Committees should include:

- Students
- Parents
- Community members
- Faculty members
- Administrators
- Business persons
- Laypersons
- Librarians
- Administrative support personnel
- Technology professionals

There should be room for outside consultants and other interested persons. The above list is only for consideration. In choosing committee members, factors to consider would include: a past history of willingness to invest their time and interests in educational endeavors; past committee memberships; strong indications of interest in this area; formal or informal leadership positions in the community; persons with known influential positions; and vocal/energetic trendsetters. However, it is imperative that *all* groups be represented.

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

- A leader who is assertive, committed, self-starting, 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.
- 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.
- Committee members should be encouraged to visit each campus in their district, as well as other school districts, to compare existing technologies.

General Introduction

This should be written in an abstract form that could include but not be limited to the following:

- Capacity: number of schools, students, faculty members
- History of committee: committee's beginning, who is involved, stages of committee, and its activities
- Short-term and long-term goals
- School's organizational structure
- Purpose of the school in the community

Data Collection, Analysis, and Reporting

Consider starting data collection with students and teachers as end users of instructional technology; this would aid in discovering how to apply technology to their specific responsibilities and working situations. This concept would also apply to other staff and personnel. A survey using open-ended questions can be useful for this purpose.

Data are likely to be used and/or reported in a variety of locations within a technology planning document. Data are necessary for many reasons, including, but not limited to:

- Describing the current status of programs, courses, student achievement, technology, infrastructure, and other existing situations
- Determining the needs of clientele, identifying standards, and discovering opportunities and problems
- Formulating and fine-tuning values, visions, missions, and goals
- Deciding how to fulfill needs, implementing plan steps, and accomplishing specific objectives
- Controlling the process, evaluating results, and revising plans

Data may be of many types, for example: demographic, descriptive, subjective, objective, and many others. Data may be collected from existing records, surveys, observations, and physical measurements. Data may describe attitudes, abilities, capabilities, status and characteristics of people, processes, curricula and other soft items, hardware, equipment, budget, finances, and other entities.

Data may be collected from various individuals at various locations. For example: the planning committee should visit all sites; office staff may extract information from student records; and students, teachers, and others can keep logs.

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/evaluator.

Interpretation and dissemination of data are equally as important as collection of data. Periodic reports (concerning data and other items) throughout the planning process will be necessary. It is important that reports be accurate, clear, and concise. Include in a report only what is necessary. 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. The data dissemination portion of the plan document should reflect the format and printed quality of the rest of the document, that is, very professional.

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

- Before any data are collected, make sure you know for which purpose you are collecting the data.
- Collect only data needed, but make sure you collect all the data you need.
- Collect data in an unintrusive manner.
- Maintain confidentiality of respondents.
- Participation by respondents should be voluntary.
- Do not use data to prove a preconceived idea; use data to discover, describe, and provide other information necessary for decision making.
- All instruments and techniques should be sensitive to bias and diversity issues.
- Make sure that what is reported is logically derived from what is collected.
- Keep surveys and other instruments as short and easily interpreted as possible.
- In surveys and questionnaires, avoid questions which lead to preconceived answers. Questions should not restrict input; open-ended questions are generally best.

Plan Preparations

The components listed under the Plan Preparations should be included in all plans and located near the beginning of the document. They are as follows:

- Goals—should say specifically what you plan to accomplish
- Objectives—how you plan to achieve the goals you have stated; state goals in measurable terms
- Timeline—states the period of time in which you are to complete the plan or goals; states approximate date(s) for completion of each phase; states major events with the use of graphics (i.e. charts and calendars)

Critical Issues

Numerous critical issues exist in planning for pragmatic use of technologies for instruction. A particularly effective strategy in preparing the section of your plan that deals with these issues is to assign different ones to committee members. You may want to assign a special task force to each issue, then let these people focus on a specific area. As the committee gives periodic progress reports, the entire committee can stay abreast of overall action. Sample issues to be considered in writing a plan should include, but are not limited to, the following:

Public Relations

The development of public relations is the process of strategically communicating with the people who are important to your ideas. Public relations programs can be big and expensive. They can also be small and inexpensive and still be effective. There is no direct correlation between the amount of money you spend and the success of your program. The success of a public relations program depends more on what is happening within an institution than on the public relations effort, in the way that *great wine* starts with *great grapes*.

When developing a public relations program the following points may be considered:

- Determine your position in your institution. What makes you unique?
- Determine your key audiences.
- There are other groups that may have a significant impact on your ideas: employees, the community, government agencies, educators, etc.
- Determine which media will best target your selected audiences. Media might include trade and technical publications, business press, television, radio, newspapers, and magazines. For special purposes, appropriate media might even be imprinted balloons, skywriting or racing cars. There are no limits except those imposed by who you are trying to reach and what you are trying to tell them.
- Formulate a strategic message to target audiences. Put together a plan outlining objectives, strategies, tactics, timeline, and budget.
- Good public relations illustrates needs and creates desires for implementing technology.

- Go forth and communicate. Tactics involved in executing a public relations program are virtually unlimited. They include standard news releases, media liaison, press tours, and so forth, but they can also include direct mail, special events, contests, and speakers' bureaus. The criteria for judging the appropriateness of a tactic include:
  - Will the tactic support the overall strategic objectives?
  - Is a key audience targeted?
  - Is its cost justified by its potential effectiveness?

Equipment

Choosing hardware should come after deciding curriculum and looking at available software. When choosing equipment, these are some of the questions that should be addressed:

- What equipment is available in the district?
- What will be the budget?
- What instruction will be necessary for staff/students?
- What functions and capacities must the equipment possess?
- What will be the minimum specifications for the equipment?
- Is the equipment user-friendly?

When preparing to evaluate software, consider the following questions:

- Can vendors give demonstrations of current technology?
- Is the software user-friendly?
- How does the software meet curriculum objectives?
- What software is presently in use?
- Have you used the Software Publishers Association as a resource?

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 and 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

New and Emerging Technologies

This section of a technology plan describes innovations that are foreseen.

- 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 again.
- Technology changes every day. Is your plan and the equipment you intend to buy able to change with it?
- 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'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 students and teachers.
- Allow staff to attend state, regional, and national technology meetings so that they may keep up to date on technology.
- Allow staff who attend technology conventions to present their findings to the building or district when they return.

Professional Development

As concerns have been expressed about technology planning, at the top of the list is professional development and training. The number one question is, "How can we teach everyone how to use technology effectively?"

It has been said that you train animals and develop people. Semantics are important to project your plan in a positive way. "Professional development" and "instruction" sound better than "training" to many people. Staff members seeking personal growth will be more motivated to participate when they hear "development."

A necessary component of an instructional technology plan should include technology awareness and skills instruction. The educational institution's professional development programs need to provide learning opportunities for all personnel by offering them instruction at workshops, conferences, etc.

Decide to make a full commitment to staff development from the start. As you prepare this component you might consider:

- What research should be done to see how much instruction the staff may need
- How much appropriate technology instruction is available
- What technologies should be included in the instruction such as use of: projection technology; computer(s) with modem, videodisc, and CD-ROM; distance learning; and computer networks
- Opportunities for personnel to attend professional development sessions (examples: Are substitutes provided? Are teachers penalized by losing sick or personal days?)
- How the district will reimburse or prepay for personnel to attend workshops, etc.
- Hiring a full-time professional development instructor who is not a "techie," *per se*, but who understands how to utilize technology in education
- Use of a "teachers-teaching-teachers" approach by reallocating time for technology-oriented teachers to instruct their peers.

Incentives/Reward System

Incentives are given to staff as motivation to continue to learn and implement higher technology skills. Rewards are "compensation" staff receives for carrying out these objectives. Congratulate and celebrate technology learning achievement.

- Plan your budget so that money is allocated for the incentive/reward program.
- Make sure staff are given a clear outline of what they must do in order to receive rewards.

- Possible rewards include:
  - A cash bonus
  - Trips to conferences, etc. (to learn technology and/ or present a successful program that is being implemented)
  - Extra personal days
  - District or school achievement certificates presented at meetings to recognize staff achievements
  - Recognition for innovators and early adopters
  - Articles to the local newspaper or in a district newsletter
  - Technology equipment as a reward for learning how to use it

Purchasing

Purchasing is the process of researching, comparing, and actually paying for equipment.

- Make sure everyone understands the rules and regulations involved in purchasing equipment and software.
- Unless you must take a certain bid, shop around for bargains. If it means saving money, beg.
- Do your research! Never purchase equipment without first knowing what you are going to do with it.
- Don't get so excited about buying equipment that you forget about the cost of software, repair, and maintenance agreements.
- Make sure the software/hardware you intend to buy meets 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

Community Resources

Community resources do not always refer to money. Use the resources available that are unique to your community. Consider the following:

- You can save money by asking a company to donate the materials and/or labor needed to rewire buildings, etc.
- Instead of paying a consultant's or trainer's fee, ask a representative or individual industry if they have someone who can do it for free.
- Ask industry or knowledgeable individuals to under-

take the task of physically setting up and putting equipment on-line. If you accomplish this, consider sending a school employee who can learn by watching and helping.
- If your plan calls for extra lab time after school or in the evenings, ask for volunteers (who meet such criteria as understanding the program being used, etc.) to run or supervise the lab. This might ease a teacher's workload.
- Conduct brainstorming sessions with community members to discover some resources your community can contribute.

Legal Aspects

Legal aspects can cover a multitude of areas from pirating software to insuring that a state's or district's technology curriculum is achievable.

- Make sure ALL staff understand the copyright laws of technology materials.
- Make sure your district is using the minimum specifications for technology. If not, does your district realize they could lose state accreditation?
- Consider an Acceptable Use Policy to guard against e-mail harassment and access to pornography. Some schools take the positive approach by referring to these policies as Responsible Use Policies.

Curriculum, Instruction, and Evaluation

Curriculum is what is learned by students. Instruction is the method in which curriculum is learned. 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. While the established curriculum, instruction, and evaluation do not necessarily have to change, they can be enhanced by integrating technology.

Curriculum and instructional methods can be a dynamic process by exchanging ideas among students, teachers, and others from around the world.

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 knowledge and skills learned
- Establishing a variety of evaluation methods
- 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

Philosophy

A school's philosophy should include making preparation and plans to accomplish goals and objectives. The plan will consist of several preliminary steps in order to reach the final

stage. Consider the role technology has in the school and community and establish a plan for implementation. Time, support, commitment, teamwork, and flexibility are required to guarantee acceptance and implementation of the technology. 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 documentation detailing specific competencies achieved through participation in the educational program. However, this would not necessarily include incidental learning experiences that occur outside the formal curriculum. 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, then place in writing for all to see, precisely the technology oriented philosophy.

Networking

A network is a collection of interconnected, individually-controlled computers, together with 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's or provinces' educational system, there must be a statewide information network. This network must integrate data, voices, and video and extend to every school district and library. An effective statewide 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
- 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 video and data communication, two-way interactive data communication (Distance Learning), Internet connectivity (i.e., network, electronic mail, file transfer protocol, gopher, World Wide Web), and voice-based information service.

Furthermore, the networking and the interconnectivity component of the technology plan must be designed and implemented so that it is capable of meeting the needs of the school, district, and state/province in the near future. Technology planning may consider the following: intra-building and inter-building connectivity; connectivity and access to the outside world; network hubs; Local Area Network (LAN); Wide Area Network (WAN); television distribution; satellite delivery; network operating systems and protocols; bulletin boards; Internet Access Providers; and on-line services.

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.

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.
- 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.
- Maintain a maintenance log on each piece of equipment (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).
- When purchasing computers, purchase extra equipment to keep in a box in case of an emergency (e.g., mouse, inside computer parts, and keyboard).
- Repair technologies as expeditiously as possible.

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 which 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

This 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 and read the computer printout as well as the inability to write and read printed information. Adaptive technologies include:

- Speech synthesizers
- 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 hands 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.

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.

Community Involvement

Community involvement is described as the interweaving of the best efforts of both the community members and the educators in producing 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.
- Involove 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 to a "hands-on," state-of-the-art learning workshop. The students can guide them on their first trip down the "information highway."
- 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.

Implementing the above 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

Security

Security is freedom from worry. By providing security you are protecting your computers, networks, personnel, and

software from destruction, misuse, and harm. There are at least three areas to consider in the security area: security of data, personnel, and facilities. Every security plan should be creative in investigating unique techniques/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 ongoing?
- What type of network security will be provided?
- What type of computer security will be used?
    - How will the staff, students, and community members access computers?
    - Will passwords be assigned?
- Will you hire someone to be responsible for data, program, virus, and network security?
- 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 people and equipment?
- Do you need to provide after-hours security for protection from theft or vandalism?
- Should diskettes be stored and locked in a central location?
- Should measures be taken to prevent students from obtaining materials that are of adult content?

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 officers need to be involved in the funding process.

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

- Fund-raising activities
- Rent-a-student programs
- Sale of outdated technology equipment

There can be local financial support programs available for school districts. For example, banks can make low interest loans to a particular school as its partner-in-progress. Also, local universities can form partnerships with school districts. Partnerships can represent projects showing how resources and tools of the Internet can improve educational opportunities and develop parental involvement in grades K – 12.

It is important to point out that this guide is not complete. This list, in conjunction with resources in your area, will provide funding sources in educational technology. New technologies will continue to emerge and must be funded continually to prevent the plan from becoming obsolete.

Fine Arts

The fine arts curriculum in the past often has 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, as important to education as English, mathematics, science, foreign lan-

guages, civics and government, economics, history, geography, and other traditional "subjects."

Arts education cultivates the whole person. Education in the arts, in part, helps students to understand human experiences, past and present; learn to respect other's ways of thinking; learn to solve problems and make decisions; understand the influences of the arts; develop skills in analyzing, synthesizing, and evaluating; communicate in a variety of modes; and build skills needed for success in the workplace and in life. Furthermore, numerous studies show a positive correlation between a substantive education in the arts and student achievement in other subjects and on standardized tests.

A good education in the arts should provide a thorough grounding in a basic body of knowledge as well as the skills necessary to make both sense and use of the arts disciplines. To fulfill this objective, "National Standards for Arts Education" have been developed, determining what the nation's school children should know and be able to do in the arts. "Fine arts" may comprise numerous forms of visual and performing arts. The National Standards for Arts Education divides the discipline into four areas: Dance, Music, Theatre, and Visual Arts, realizing that each of these encompasses a wide variety of forms and subdisciplines.

These standards address competencies rather than predetermined courses of study and they are arranged by grade levels (K – 4; 5 – 8; 9 – 12). With implementation of these standards, students in all grades are involved actively in comprehensive, sequential programs that include creating, performing, and producing as well as opportunities for study, analysis, and reflection. With the emphasis on sequential learning, each area is outlined by content standards (specifying what students should know and be able to do in the arts discipline) and achievement standards (specifying the understandings and levels of achievement that students are expected to attain in the competencies) for each of the arts, at the completion of grades 4, 8, and 12.

When developing fine arts the following points may be considered:

- Consult the "National Standards for Arts Education" with the goal of bringing together and delivering a broad range of competent instruction.
- A fine arts curriculum can help children develop in most of the seven types of intelligences: visual/spatial, bodily/kinesthetic, musical, interpersonal, intrapersonal, linguistic, and logical/mathematical. These are seven distinct learning styles identified by Howard Gardner of Harvard University. Gardner has documented "*the extent to which students possess different kinds of minds and therefore learn, remember, perform, and understand in different ways.*"
- Integration of art into the teaching of other subject areas causes the related learning to be more relevant.
- Participation in the arts elicits pleasure as well as intellectual and aesthetic stimulation.
- Teachers can use technology to enhance both the creation and the understanding of all areas of the fine arts, including movies and animation.
- 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) keyboard 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:
  - Partnerships with area arts organizations can be developed.
  - Teaching alliances with art specialists can be formed.
- Address the issues of teacher preparation and professional development in the arts.
- Consider grants funding via arts organizations.

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 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 to 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
- Training 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

Lifelong Learners

A lifelong learner is a person who, having recognized the importance of education and technology, continues to search for new and exciting ways to accomplish life's tasks.

- Emphasize that being a lifelong learner does not necessarily mean pursuing formal education and research.
- The district should provide opportunities for learners other than students by designing adult evening classes that allow the community to use the technologies.

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 fuse boxes handle the additional power needed to run the equipment?)
- Data lines
- Security
- Furniture
    - Ask teachers' opinions about classroom layout.
    - Do you want furniture built into walls or flooring so that there is no exposed wiring, etc.?
- Fire codes
- Panic buttons

Other Critical Issues

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

- Obsolescence
- Environmental Issues (conservation)
- Access/Equity
- Ergonomics (making equipment and furnishings user-friendly, e.g., table height, comfortable seating)
- Standards
- Communication

Evaluation

Objectives and their delivery are of paramount importance. However, without evaluation, only gut-feelings can indicate if effort and resources expended have produced the desired results. Evaluation should be built into the planning cycle and not be an afterthought. Also, evaluation should be continual and not just at the end of a cycle.

Every step in a plan should be evaluated. Evaluations will be performed at varying points in the planning cycle. The type of evaluation, its detail, and duration will depend on the step being evaluated and the decisions that have to be made that surround or interact with that step. As in reporting data, the purpose of the evaluation and the intended audience are prime considerations. It is prudent to seek the advice of an evaluation expert.

Evaluation may be covered in multiple parts of a technology plan, e.g., implementation plans, critical issues, needs analysis, reporting, and other sections. In addition to other sections, evaluation usually warrants a dedicated section to clarify evaluation purposes and procedures.

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.

- The actual budget may be included in the appendix.

• This section may include a narrative justification or explanation of various components in the plan.

Bibliography

The bibliography is a collection of sources that have been used to compile data and which have been referenced in the report. (examples: books, periodicals, contacts, interviews, Internet sources, etc.)

Glossary

The glossary is a list of all obscure or technical words used throughout the plan and their meanings. The glossary is arranged alphabetically.

Appendices

The appendix section allows you to accumulate many documents and source information that have assisted you in the planning process. Here you should include samples of your surveys, staff development sessions, committee minutes, inventories, and committee members' resumes. The appendix is a section to which you can refer throughout your plan without having to include the original documents at the specific points where you mention them; you can direct the reader to a particular appendix.

An especially good appendix entry enumerates activities in which most school personnel are involved. This will give people an opportunity to see their name in print and to give evidence of the widespread input you had in developing the plan. Use this section wisely.

Index

The index is an alphabetical list of names, subjects, titles, etc., giving page numbers where references are made. It is generally placed at the back of the plan.

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