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CREATING A TECHNOLOGY USE PLAN:

AN ON-LINE HANDBOOK FOR SITE TECHNOLOGY LEADERS

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

in

Education: Instructional Technology

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by

Molly Jean Carbo

December 1996

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ABSTRACT

The goal of this project is to design and develop an on-line manual that will serve as a reference tool for teachers, administrators, school board members, parents, and interested community members who have an interest in creating an effective Technology Use Plan. As an on-line manual, the project is accessible through the World Wide Web, from the Riverside, Inyo, Mono, and San Bernardino County California Technology Assistance Project home page (http://163.150.7.51/RIMS/RIMShome.html). The project provides suggestions and guidelines, based on educational research, of how to create, implement, and sustain a TUP, particularly at the site level. It addresses the needs of those schools that are trying to bridge the gap between technology acquisition and the implementation of technology for educational goals. In addition to providing basic guidelines for the creation of an effective TUP, the project includes URLs of sample TUPs, surveys for determining current uses and future technology needs, and Internet acceptable use policies. This project reflects the position that TUPs must be outcome-based, specifying what students and staff should be able to do with technology to meet educational goals, as is consistent with the research.

ACKNOWLEDGEMENTS

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CHAPTER ONE

INTRODUCTION

It is the goal of American education to prepare children to be involved and productive citizens of the future. All students should be equipped to succeed in a fluid, information-rich society. A new way of educating is necessary to meet the new forms of work needed in the business world of the near future (Reigeluth, 1992). More importantly, new approaches are needed to meet the needs and concerns of our students, and to prepare them for active citizenship in a global, information-rich society (Wagner, 1993).

Educational reform comes from the realization that current instructional systems are not adequately preparing students. A major revolution in the way instruction and assessment are performed has begun. This reform effort is being driven both by grassroots efforts and by national and state policy changes. Educators are looking for a new kind of school to meet the educational challenges faced by today's students. They are looking for a school "designed for learning, rather than teaching" (Peck & Dorricott, 1994).

Constructivist learning theory indicates that students learn best through meaningful interactions with the world around them, which develop critical thinking and problem solving skills. By arriving at a personally meaningful understanding of issues, students become adept at the learning process, and find learning to be motivational and rewarding (Bagley & Hunter, 1992).

Educational technology will enable the creation of an environment where teachers guide learners as they construct new knowledge for themselves. This technology can foster new teaching and learning opportunities which will provide essential thinking skills to the next generation of adults. Strommen and Lincoln (1992) suggest that principled changes in the curriculum are needed to improve our nation's schools, and effective technology must be a part of these changes.

Throughout the educational system, there is a lack of awareness of effective uses of technology in today's schools (Strommen & Lincoln, 1992). This system-wide, or systemic, failing has left American schools behind in a technology-rich environment. Technology is a critical element for student achievement of world class standards, allowing students to access information, manipulate data and express ideas to an authentic audience (Bellingham, 1996).

Too often, technology is simply seen as an additional subject, or an add-on to the regular set of instructional objectives. The effective use of technology, however, can support and promote new educational systems involving student-centered classrooms, interactive instruction, real-world problem solving, and multidisciplinary studies (Transforming, 1995). The goal of technology in the educational system is to improve all types of teaching and learning through the infusion of technology. Technology infusion, however, must be planned for, so

that it is an integral part of the instructional goals and is integrated into the curriculum.

The Technology Use Plan (TUP) is an integral part of effective school improvement plans. It does not exist in isolation, rather, it is a part of the school's comprehensive plan for student learning. Despite the fact that most schools now own computers and other technology, many districts and schools do not yet have current, comprehensive technology plans as a component of their statement of educational goals.

Creating an effective TUP can be difficult. There are few practical guides that a school can obtain that can provide information as to how to plan for technology infusion. Although there are educational institutions which have successfully addressed technology and educational reform issues, these schools are often seen as flukes. Many technology leaders believe that these institutions were able to make the leap from ordinary to the extraordinary only through the infusion of money and with the help of expert consultants. The majority of educational institutions do not have the time, money, or know-how to implement such sudden educational reform efforts (Pondiscio, 1996).

The Technology Use Plan is really a misnomer. The goal of the Plan is not to specify how to use technology; rather, it is to determine how technology will be used to support curriculum and educational goals. Technology tools must be integrated into the regular curriculum in a manner which helps improve students' understanding of instructional concepts and themes (Bellingham,

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1996). The plan should include not only provisions for technology applications which will help students to meet instructional objectives, but also provisions for teaching students how to search for relevant technology applications on their own.

This project addresses the needs of those schools that are attempting to bridge the gap between technology acquisition and implementation of technology for educational goals. The final project consists of an on-line manual detailing the steps in creating an effective Technology Use Plan at the elementary site level. The Internet, as the largest data resource available, is a logical place to distribute this project. Therefore the project is presented on the World Wide Web as an HTML document, currently best viewed with Netscape Navigator, entitled "Designing a Technology Use Plan." Within the web document, there will be links to sites that provide information and research about educational technology and its role in the curriculum. In addition to the guidelines for the creation of an effective Technology Use Plan, the project will include sample TUPs, surveys for determining current uses and future technology needs, Internet acceptable use policies, and examples of technology-rich curricular lessons which can be viewed and/or downloaded for use.

Schools or districts that are interested in creating a plan for the integration of technology in the curriculum can access this project directly off the disk or over the World Wide Web using a browser program. This project

provides suggestions and guidelines, based on educational research, of how to create, implement, and sustain technology-driven systemic reform. It provides a way for sites to implement technology in the total school system, rather than using technology as a mere add-on. Schools that follow the steps provided in this project for the creation of a Technology Use Plan will not only have an articulated plan for technology infusion, but will have a collaborative vision and a systematic method for reaching their educational technology goals.

This project reflects the position that TUPs must be outcome-based, specifying what students and staff should be able to do with technology to meet educational goals. Ideally, technology should be a transparent part of the curriculum. At the highest level of technology implementation, students have access to and knowledge of a variety of technology tools, and they use those technology tools to solve authentic problems. In this project, technology is presented as a vehicle for "information queries, problem solving, and/or product development" (Moersch, 1995).

CHAPTER TWO

REVIEW OF RELATED LITERATURE

CONSTRUCTIVIST LEARNING: PREPARING FOR THE FUTURE

There is widespread dissatisfaction with the current educational system. The national community is beginning to acknowledge that new knowledge about teaching and learning must become a part of a revised educational system in order to reflect the conditions and needs of today's global community (Anderson, 1993). Those students who can think critically and creatively, solve complex problems, and utilize technology will be successful in the world of the future. Improving teaching and learning must address a wide range of issues, including management structure, finance, student assessment, and curriculum (Bellingham, 1996).

In the past ten years, there have been many studies that have shown that American students, functioning in an outdated educational system, have fallen further and further behind their peers in the world community when it comes to critical thinking, communication, and problem solving skills (Walberg, 1990). Apparently, the traditional forms of education are not meeting the needs of America's students.

Despite the fact that the business community now is more interested in hiring people who know how to learn, our system of teaching is still producing graduates who simply know facts. Higher level thinking skills cannot be taught

in the same way that basic math facts are taught. Students need to develop

critical thinking skills on their own, through experiences guided by the instructor

(Peck and Dorricott, 1994). Students learn more when they are placed in a

student- centered environment where collaborative learning of authentic tasks

takes place (Nicaise & Barnes, 1996). This process is referred to as

constructivist learning.

Constructivist learning theory states that knowledge "is a function of how

the individual creates meaning from his or her experiences" (Jonassen et al,

1995, p. 11). This is in direct contrast to objectivist learning theory, which

assumes that the world is structured, and the goal of the learner is to reflect

reality as presented by the teacher. Constructivists believe that people actively

seek knowledge and construct meaning from their experiences. This theory of

learning through innate goals and curiosities was made popular by Jean Piaget

in the 1960's (Nicaise & Barnes, 1996).

Cognitive psychology, which encompasses constructivism, suggests that

greater learning occurs when students deal with real-world situations (Nicaise

& Barnes, 1996). Communication and collaboration are important aspects of

cognitive growth in the constructivist view. Students learn to critically analyze

concepts as they express ideas, ask questions, and dialogue about authentic

problem solving situations. This leads to improved cognitive growth, as well as

better social and communication skills (Pepi & Scheurman, 1996).

In the constructivist view, learning is a natural process, usually directed by the learners themselves as they seek to understand the world and their own place within that world. Rhodes (1995) says that learners do this by taking in information from their interactions with the world and constructing new understandings. These new understandings must build upon what the learners already know, and the ideas must connect to their world. The learners test their new understandings with continued interactions with their environment, increasing their ability to solve problems intelligently. In the process of assimilation, students' ideas become more complex and powerful, and learners develop insight into how they think and learn (Strommen & Lincoln, 1992). The ideas and insight that students develop are "active" knowledge, in that students can use the information in new situations (Jonassen et al, 1995). According to constructivist learning theory, students learn best when they work together to become a group of scholars, where they master new knowledge, critically examine their beliefs, and engage in a personally meaningful quest for understanding (Jonassen et al, 1995). Thus, the goal of an educational system, according to constructivist theory, is to demonstrate to students how to construct meaning on their own (Cunningham, 1991).

Although the focus of the learning experience is on the student, this does not mean that the teacher does not have a role. Teachers must be coach and resource person for their students, providing structure and actively encouraging appropriate performance (Means & Olson, 1994). They are the

power behind the learning, for they focus the students' attention, suggest

options to explore, intervene when necessary, and provide feedback (Brandt,

1993).

According to Jones, Valdez, Nowakowski , and Rasmussen (1996, p. 7),

there are seven variables which indicate that effective teaching and learning

are occurring:

1. Students are engaged in authentic and multidisciplinary tasks.

2. Assessment is based upon students' performance of real tasks.

3. Students participate in interactive modes of instruction.

4. Students work collaboratively.

5. Students are grouped heterogeneously.

6. The teacher is a facilitator in learning.

7. Students learn through exploration.

These observable variables indicate the presence of a constructivist learning

environment which encourages active participation in learning.

TECHNOLOGY AS CONSTRUCTIVIST LEARNING TOOL

In the constructivist environment, technology has a chance to exert a

significant impact on teaching and learning. In this environment, technology

facilitates classroom experiences which emphasize the skills necessary for

success in the future: critical thinking, collaboration, compromise, and

communication (National Academy of Sciences, 1995). As classrooms move

away from the didactic approach, the role of technology has expanded to support complex multidisciplinary tasks, authentic assessment, and collaborative learning (Means & Olson, 1994). Ideally, technology should be a transparent part of the curriculum. At the highest level of technology implementation, technology is perceived as a process, product, and tool to help students approach learning from new directions, and solve authentic problems related to an identified real-world problem or issue (Hill, 1996).

Technology, in the past, was used for isolated activities rather than being an integrated part of the regular curriculum. There was no identifiable link between technology and instructional objectives such as higher order thinking skills, analysis, and problem solving (Moersch, 1995). If, however, technology is integrated into the curriculum, it becomes a tool to learn ideas and skills in all of the content areas, as well as a means by which students can become actively involved in their own learning (Bagley & Hunter, 1992).

One prime reason for the infusion of technology into schools is that it can improve the quality and quantity of students' critical thinking and problem solving skills. Research indicates that computers and other technologies are effective, creative tools for active learners, when used as a transparent part of a school system (Transforming, 1996). Technology should be a means or attaining our goal of improved learning outcomes, not an end in itself. According to Rhodes (1995), technology should be considered an enabler for the new roles and relationships in education called for by reform efforts. Many

educational reform movements, such as Goals 2000 and the Coalition of

Essential Schools, place a "strong emphasis on improving teaching and

learning through the use of educational technology" (NT Plan Summary, 1995).

Although educators have long known that constructivist learning is the

ideal, they have been unable to apply it efficiently in the classroom (Staff,

1994). With technology, the focus of instruction is able to shift from teacher-

centered to student-centered. Students can use extensive resources while

performing "authentic, hands-on inquiry related to a problem, issue or theme"

(Moersch, 1995). Through the Internet, a multi-platform collection of linked

computer networks that allows users to access and share vast amounts of data

and other resources, students can access thousands of databases of

information, many containing primary sources and works by experts in various

fields (Williams, 1996). In addition, collaboration is encouraged through the

use of technology. Students often work together and learn from each other,

rather than having the teacher be the sole source of information. When working

collaboratively, each student brings his or her own perspective and abilities to

the group, and the end product often reflects an understanding of more than

one point of view, as well as a more complete understanding of the content

(Hertzke & Olson, 1994).

Well-designed educational technology can push students into engaging

in problem solving and critical thinking, and encourage them to formulate and

test opinions and hypotheses. Because information on the Internet is available

from a variety of sources and contains a variety of biases, students are forced to analyze and evaluate the quality and credibility of the information they access (Carvin, 1996). This critical thinking skill is developed through many interactions as students explore and construct meaning from the many resources available (Cady & McGregor, 1996). Productivity tools such as desktop publishing, databases, spreadsheets, and multimedia authoring programs allow students to gather, evaluate, and communicate information in ways that reflect their own tastes and personality (Means & Olson, 1994). Educational technology frees students to focus on analyzing, hypothesizing, and synthesizing. According to B. Gifford, in the Educom Review Roundtable discussion (Staff, 1994), students become engaged participants in their own learning, rather than passive recipients of knowledge.

Technology gives learners access to challenging material and gives them the ability to tackle complex assignments that would not have been feasible without the help of technology. Students are able to engage content that would not previously have been available until much later in their academic lives, and the answers to their inquiries are not limited by the teacher's knowledge (Means & Olson, 1994). As they grow in technological skill, students spontaneously attempt more difficult assignments, knowing that technology can enhance what they produce. Teachers and students alike develop higher expectations (It's Not Where, 1995).

Technology can expose students to concepts that would otherwise be too expensive or too dangerous (Dyrli & Kinnaman, 1995). It can allow them to contact and interact with geographically remote areas. Communications technology allows students to speak with and/or correspond with experts in almost any field. In addition, they can actively engage in activities with other students around the world, participate in global projects, and share information with others. The Internet makes resources from around the world, including primary source materials, available to students (Sellers, 1994). Hypertext multimedia gives learners the opportunity to follow associative links as they investigate a topic. The type of information students access and the way they access it is determined by the learner. Students can browse, or they can target specific information. Teachers, as coaches, can help students explore their own interests, as well as providing project opportunities that help students meet specific curricular goals. In any or all of these cases, the learning experience has more depth and breadth than is available without technology, and the student is responsible for exploring and constructing meaning.

The primary role of technology in the classroom is as facilitator. Students can use technology to facilitate their own learning, and become more actively involved in their education. Teachers may use technology to facilitate routine administrative tasks, and provide additional curricular experiences for their students. According to Bagley and Hunter (1992), the role of the teacher is to guide and empower students to discover on their own the concepts

necessary to fully understand a project, and to provide a forum for students to exhibit their understanding in a meaningful way.

With the theories of constructivist learning as a backdrop, technology should be viewed as a tool for engaged learning in meaningful projects. Students learn best when constructing projects that demonstrate their understanding, and technology is the most authentic way for students to research, design, analyze, and evaluate their projects (It's Not Where, 1996). It provides the immediacy that students are familiar with in this information age (Strommen, 1992). The goal is not for students to become experts in any particular software package, but for students to feel that modern technology is both useful and accessible.

Technology tools must be integrated into the regular curriculum in a manner that helps improve students' understanding of instructional concepts and themes (Etchison, 1994). The school must not only provide technology applications which will help students to meet instructional objectives, but also teach students how to search for relevant technology applications on their own. Use of technology helps to shift the educational focus to gaining new knowledge, along with interpreting, applying, and presenting that knowledge.

According to Muir (1994), "if students find learning more interesting and engaging as a result of creating an interactive project, then computers have served their purpose. If students become more enthusiastic about research-- because they know that their final report is going to look good and be fully

interactive--then computers have made a valuable contribution to the educational process."

THE INTERNET: A TOOL FOR THE WORLDWIDE DISTRIBUTION OF INFORMATION

The Internet was begun in the early 1970's. Originally, it was designed to connect the United States Department of Defense computer and communications networks with various other radio and satellite networks. In the 1980's, everyone was allowed access to the Internet network, if they had the correct hardware and software. Universities soon became "wired", or connected to the Internet, and, as graduates entered the economy, they encouraged the businesses that employed them to become connected as well (Williams, 1996). Many people have supported moving this technology into secondary and elementary schools to promote access to information and an awareness of current technology.

According to the Internet Society, (1996), more than thirty thousand schools had access to the Internet by June of 1995. Researchers estimate that there were 9.5 million computers providing resources and data on the Internet by January of 1996, and there were 75,000 World Wide Web hosts as well (Lottor, 1996). The World Wide Web (WWW) is simply a distributed collection of servers which connect "pages" through hyperlinks, or clickable pointers (Williams, 1996). Web pages can contain text and graphics, as well

as animation, audio and video clips (Cady & McGregor, 1996). Hypertext

links allow an intuitive exploration of topic of interest with minimal search and

retrieval time.

Williams (1996) provides several reasons why students should use

technology, including the Internet, as a part of their educational experience.

These include:

- The Internet provides real world examples of integrated knowledge.

- Use of technology facilitates collaborative learning.

- The Internet provides opportunities for telementoring.

- The Internet is racially, sexually, religiously, and culturally blind.

- Technology can cater to differences between learners.

The World Wide Web (WWW) is one of the largest source of published

information in the world. With little experience, anyone can publish documents

on the WWW. With the amount of information available, it is important for

searchers to be able to locate the information they are seeking quickly and

easily. Therefore, it is important that documents published on the WWW be

simple to understand, intuitive to follow, and effective in design (Fisher, 1996).

Graphics-laden web pages take significantly longer to load, and searchers who

are interested in technology planning information are unlikely to wait to see if

the site is useful. Sites that scroll for many pages are laborious to read and

difficult to follow, so the judicious segmenting of information is desirable

(Glover, 1996). To keep readers focused on the information provided, colors

and graphics should not be distracting. All of the rules of page layout in print publishing apply equally well to the WWW.

Because of its dynamic interface and the fact that information on the Internet is available to people around the world, this project will be posted to the WWW. Based on its characteristics as a dynamic medium, and its growing availability in educational institutions across the country, the author believes that the Internet is the most appropriate location for this project. Schools will be able to access the document, download and/or print portions or the manual in its entirety, and follow links to additional sources of information regarding technology planning and the creation of Technology Use Plans.

SYSTEMIC CHANGE: THE ROUTE TO TECHNOLOGY IMPLEMENTATION

Education today is in a state of change. Schools are facing a diversity that was not present in the past. The information age and its technology have made an impact on what people must know to function in their adult roles (Strommen & Lincoln, 1992). The efforts to superimpose constructivist learning theory over the existing, outdated educational structure has been a failure. Technological changes that have revolutionized society have left schools basically unchanged (Reigeluth, 1992). Technology has given educators a way to implement a better system of learning, but this requires a major change in the fundamental structure underlying the current educational system (National Academy of Sciences, 1995). The current hierarchical structure of the

school must be replaced with an egalitarian, cooperative structure in which the learner is the focus (Strommen & Lincoln, 1992). Peck and Dorricott (1994) claim that educators are searching for a paradigm shift; a way to create new educational system using effective technological tools and constructivist learning.

Over the past 25 years, schools, counties, and states throughout the country have made many efforts to reform the educational system. The restructuring currently being advocated deals primarily with 1) strengthening teachers' skills, 2) systematically improving curriculum, and 3) involvement of parents and community in responsible shared decision making partnerships (Saphier & King, 1985). This requires systemic change.

Systemic change means systematically making fundamental changes that encompass every aspect of the school system (Holzman, 1993). Phil Schlechty (in Brandt, 1993) defines systemic change as "changing the system of rules, roles, and relationships that govern the way time, people, space, knowledge, and technology are used". Systemic change, or systemic reform, must be simultaneously "top down" and "bottom up", which means that leadership must come from teachers, principals, staff, and parents in individual schools, as well as from policy makers at the local, state, and national levels (NT Plan Summary, 1995).

All too often, new practices and theories are forced upon the major players: the teachers, parents, and students. According to D. Niguidula, in the

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Educom Review Roundtable Discussion (1994), if there is little agreement about what changes are needed and why, there is little chance of the reform effort being successful. For meaningful change to occur, there must first be dialog about the current strengths and weaknesses of the system, and about the priorities and goals for the future. "The real methodology for system change begins and ends with ongoing, authentic conversations about the important questions" (Wagner, 1993). Schools must be a part of a totally supportive system, from the district to the county, to the state and the nation (Brandt, 1993). All participants, including students, parents, teachers, administrators, and community members must take part in the dialog, looking first at how society has changed, and then at how schools have changed to keep up. Paradigms and policies are examined to determine whether they best support the vision and goals of the institution (Miller, 1992). It is critical that participants recognize first that "rapid technological, economic, and social changes have radically altered the skills needed for productive work, active citizenship, application of knowledge, and development of good habits for personal growth and health" (Wagner, 1993). In addition, systemic reform plans must recognize that teacher preparation and ongoing staff development are critical to long term success (O'Neil, 1993).

Standards-driven policy changes at the federal or state level assume that centralized control and accountability will miraculously bring about a better educational system. This runs counter to past experience, which has shown

that the majority of schools are impervious to such isolated "top-down" legislation (O'Neil, 1993). As politicians call for changes in standards, funding, and assessment, those at the site level must also evaluate current instructional practices and curricular goals.

O'Neil (1993) claims that many states have begun to redesign their educational systems using the framework of the Goals 2000: Educate America Act. Unlike previous educational reform efforts, the Goals 2000: Educate America Act of 1994 attempts to encourage a learner-driven instructional system based on constructivist learning theory. It provides general outlines which focus attention primarily on the needs or the learner, followed by the needs of the community and the educational providers (NT Plan Summary, 1995). It gives suggestions of several components of educational vision statements and instructional goals. The Act indicates that new educational visions should include the following goals:

- Improve learning outcomes - including measurable objectives and evaluation strategies.

- Promote engaged learning - learning while doing and learning from doing.

- Students should have the ability to reason, solve problems, and write and communicate effectively.

- Students will graduate with the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

- Equitable access to technology.

- Improved communication and interaction with parents and families. Promote partnerships that will increase parental involvement and participation.

- Effective staff development, with continuing opportunities to acquire additional knowledge and skills needed to teach challenging subject matter and use emerging new methods and technologies.

According to the United States Department of Education National Technology Plan Summary (1995), most states are using Goals 2000 funds to "develop technology plans that are to be integral to the State improvement plans". This includes emphasizing the issue of teacher preparation and on-going staff development as a condition of effective school reform.

Technology can be an extremely effective constructivist learning tool if and only if teachers feel competent to use it (Barnett and Nichols, 1994). Good staff development uses the same technology teachers have available, and is responsive to the comfort level, expertise, and needs of the participants.

THE TECHNOLOGY USE PLAN AS AN INSTRUMENT OF CHANGE

For most people, change is a prospect that inspires dread. Resistance to change is a natural and reasonable reaction, because most people are more comfortable with the familiar (Harvey, 1990). Implementing a new vision of technology in the educational setting is a change that may be very intimidating

to many staff members. Therefore, agents of change must take into consideration the steps in the change process: developing climate, creating a vision, and training for change.

The first step in the change process is building a climate that supports change. A school climate that supports change has several key elements: collegiality, high expectations, support for risk taking, trust and confidence, administrative support, honest open communication, and an interest in continually expanding the knowledge base (Far West Laboratory, 1995). An administrative commitment to change includes a sharing of power and decision-making, as well as a reallocation of resources. In this supportive climate, teachers and other stakeholders collaborate to create a shared vision of the educational system (Anderson, 1993).

According to Langhorne, Donham, Gross, and Rehmke (1989), educational technology implementation goes through three major stages as it grows toward integration. Initially, technology is a novelty item, and only self-taught teachers utilize the technology. Eventually, the technology becomes scattered throughout the school, and many teachers are exposed to it, although not necessarily trained to use it. Innovative teachers who are comfortable with the technology begin to use it as a tool. In the final stage, called "Planful Integration" by Langhorne et al (1989), technology is used when appropriate to instruction, and planning emphasizes instructional soundness. More emphasis is placed on teacher inservice, especially training related to curricular goals.

This level of implementation, however, can only be reached when teachers have access to technology, and feel competent to use it (Barnett & Nichols, 1994).

The majority of schools are at the intermediate stage of implementation with most technology. One primary goal of creating a Technology Use Plan is to move schools into the final stages of integration.

The Technology Use Plan (TUP) is a document that outlines effective systemic change at a school site (Church, 1995). It defines the role technology will play in the proposed constructivist learning environment. In order for technology to be a catalyst for changing educational systems, it must be driven by learning (See, 1994). The TUP defines what technology will be used, how it will by used, what cognitive, communication, and social skills will evolve, and how the learning will be evaluated (NT Plan Summary, 1995). The TUP is a document which is the result of a plan for systemic change, focused on improving all segments of instruction, using technology as a transparent part of the teaching and learning process (Anderson & Perry, 1992).

The purpose of a Technology Use Plan is to carefully examine and delineate the role of technology in the educational setting (Anderson & Perry, 1992). It maps out a plan for the effective use of technology in the instructional setting. The TUP ensures that technology will be implemented in an organized, effective manner to better achieve the desired curricular outcomes. The curriculum should be at the heart of the use of technology in the school. The

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curricular goals of the district and site state what students will be taught; the

TUP explains how technology will be used in the dissemination of the

curriculum to reach those curricular goals. The technology should be an

integral part of the curriculum, much the same way that paper and pencil are

currently embedded in the instructional process. Technical applications must

be utilized in every part of the regular curriculum so that students learn how

technological tools can make them more productive and powerful learners in

any subject area (Microsoft, 1996).

The TUP serves as a guide for parents, teachers, administrators, and

students, explaining the way in which technology will be planned for,

implemented, and integrated into the curriculum effectively and efficiently. It

works within the context of the total school environment by addressing issues

such as curriculum, integration, staff development, facilities design, budgeting,

and the purchasing of new resources. It is an integrated part of the overall

strategic long-range plans of the school community (Anderson & Perry, 1992).

As such, the site TUP should match the overall district strategy for educational

technology use.

A strong TUP begins with a common understanding of what constitutes

an educated person in today's world. This definition of an educational system

and what it must accomplish becomes the vision that will drive the change

process (Wagner, 1993). A vision statement must be more than simply a

statement that sounds impressive and looks good posted on School Board

flyers. It must be widely understood, and must lead to a set of expected student

outcomes that can be assessed in some manner acceptable to all participants

in the process (Dyrli & Kinnaman, 1995). The vision is the long range dream of

the way technology will be utilized in the classroom and throughout the school

(Microsoft, 1996).

Once a vision has been decided upon, specific goals and objectives can

be determined. These goals and objectives should be clearly articulated so

that it is readily apparent how they lead to the vision of technology use (Smart

Valley, 1996). Goals and objectives might reflect academic and research uses

of technology by students and teachers, as well as instructional and classroom

management uses (NCTP, 1996).

A survey of what technology is available and how it is currently being

used provides a framework for determining which goals are most attainable,

and which will require more extensive preparation. This survey will be written

into the final plan as a "statement of existing conditions".

After the survey has been analyzed, it is necessary to determine

priorities and develop a timeline for change. Everyone involved must develop

new skills and new attitudes as called for by the vision, goals, and objectives,

and these changes take time. Expecting an instant change simply because a

vision has been agreed upon is asking for failure. The initial priorities should

encompass no more than four objectives, which should be understood by all

participants, and supported through trainings and staff development (Wagner,

1993). Resident experts, who are already a part of the change group, should be allowed to develop and share their expertise with the group in supportive and non-threatening ways. Each of these components must be reflected in the Technology Use Plan.

The most simple way to create a TUP is for an administrator to assign a team of teachers, already technologically literate, to decide upon a vision, and then develop strategies to reach the defined goals. This method, although apparently logical for the short run, is doomed to failure in the long run. With this method, for most of the staff at the site, the TUP is someone else's vision, and has no personal meaning.

Instead, the TUP should be a living document, growing and expanding to meet the needs of the students and teachers it serves. First, an initial technology vision is put forth by a team of individuals. This team must be expanded to represent all stakeholders in the school community: teachers, administrators, parents, community members and students. Each member of this committee must be committed to creating a working plan to lead the school into effective technology use (Anderson & Perry, 1992).

A percentage of the teachers on any given staff will be unfamiliar with, and therefore uncomfortable with, new technology. Before those teachers can take a part in developing a Technology Use Plan, they need to be exposed to the new technology in a positive learning environment. According to the National Technology Plan (1995), these teachers must get the chance to learn

through full engagement with the technology. They must be provided

opportunities to collaborate and problem-solve as they learn. As staff work

together to try things out, inquire, and evaluate, they become more skilled with

the technology, ideas grow, and they become partners in the change process

(NT Plan Summary, 1995). In this environment, teachers have the opportunity

to be self-directed learners, which allows them to construct a meaningful model

of how technology will work effectively in their particular classroom environment

(Holmes & Duffey, 1993). A Technology Team, comprised of site technology

leaders, may take the role of facilitating this transformation, easing the anxiety

of change as much as possible.

Strategies for long-term success build upon trust. Staff must share in

choosing, developing, implementing, and evaluating the innovations set forth in

the TUP. Teachers will buy into a TUP only if they feel they have had a part in

developing it, and if they believe that it represents their own best interests. As

staff become more skilled in technology, they will be able to provide positive

input to improve the Plan, making it more fully a shared vision of the role

technology will play in the curriculum (Dyrli & Kinnaman, 1995).

Blueprints for change go beyond simply writing more comprehensive

goals and listing the desired software and hardware. It is imperative that

planning include methods of encouraging individual teachers, as these are the

people who will be implementing technology in the curriculum (Fullan, 1994).

Teachers need ongoing training, reliable support, and staff development in

order to be successful with the integration of technology into the class and the

curriculum (NT Plan Summary, 1995). In order to increase significant long-term

success, the staff needs to experience numerous small successes along the

way. An effective staff development process is one which leads to using

technology in the manner indicated by the vision and goals of the Technology

Use Plan (Holmes & Duffey, 1993). It must be teacher-driven, so that it is

meaningful to the participants and answers their needs and interests. Without

consistent support, the changes necessitated by the TUP are destined to

continue only on paper.

It is critical to remember that a TUP is a living document: revisions and

modifications are not just acceptable, they are desirable. As technology

changes and teachers grow in knowledge, it becomes obvious that there may

be many paths that lead toward the shared vision. All staff members need to

learn from those many paths, and share them with others.

The TUP is only meaningful as a facet of systemic educational reform.

The effective use of technology is achieved through effective vision of change,

effective sharing of power, well designed training and professional growth,

positive curricular reform, and meaningful partnerships between the school and

the community (Bagley & Hunter, 1992).

"Technology has been in the schools for a decade and a half now,

but it took several years for the initial infatuation with RAM and ROM to

wear off and a realization to hit that, as with any new tool - from film

projectors to calculators - teachers have to be trained to use it. Only

then can the innovation become a part of their teaching repertoire, and

not just a reward for students when they finish their work."

(Siegel, p. 46, 1995)

A REVIEW OF EXISTING TECHNOLOGY USE PLANS

During the research portion of this project, and in the development of the

project, the author analyzed numerous Technology Use Plans from school

sites, districts, and counties throughout the United States. By pulling together

the strengths from various different TUPs, the author was able to develop

guidelines for the elements of an effective TUP.

A Technology Use Plan is a proposal whose components include an

encompassing vision of the educational institution, the mission and goals of the

institution, the strategies that will be used to achieve those goals, and the role

that technology will play in the vision, goals, and strategies. A well written TUP

begins with a vision statement. It then identifies goals, and determines ways in

which technology can be used to meet these goals. It must include provisions

for training staff, building an infrastructure, monitoring progress, and an

evaluation of the effectiveness of the way technology is used. A budget,

acquisition timelines, and funding resources are also recommended parts of an

effective TUP.

According to the summary of Voices from the Field (1995), there are five elements of a Technology Use Plan that are critical to success. They are:

- Vision: A well articulated vision of change with a primary focus on engaged learning and empowered teaching.

- Staff training: Attention to professional development and user support, including ongoing training, tutorials, and help-desk support.

- Buy in: Active participation in the change process by all stakeholders including learners, teachers, parents, administrators, and others from the community.

- Revision: Technology plans that are open and allow room for growth.

- Budget: Funding plans that clearly establish costs/benefits, and are both reasonable and sustainable.

The North Carolina Instructional Technology Plan offers a sample technology planning guide at their web site that reflects these same goals. They suggest that the process of creating a TUP should follow six distinct stages:

- Planning: Develop a vision statement, investigate effective technology practices, create leadership team, get staff buy-in.

- Internal Assessment: Assess current uses of educational technology: Inventory current equipment and infrastructure, survey students, staff, and community regarding technology skills, knowledge, and attitudes.

- Identify curriculum goals: Assess local strengths and weaknesses, determine technology integration approaches, create goal and objective statements.

- Analyze and design support systems: Determine necessary equipment to meet goals and objectives, develop plan for staff development and support, revise policies and procedures as necessary, create budget including funding sources, select appropriate evaluation tools, activities, and benchmarks.

- Implementation: Prioritize implementation goals, establish timeline for acquisition and implementation, reallocate and upgrade resources.

- Evaluation and revision: Monitor effectiveness of programs and activities, compare progress to predetermined benchmarks, review and revise goals and timelines as necessary. Plan for future considerations such as up-dating systems, upgrading, maintaining, repairing, and replacing technology items.

The Hemet Unified School District Technology Plan and the Corona-Norco Unified School District Technology Use Plan include a component entitled "Instructional Technology Curriculum Matrix" (Appendix B). The goal of the matrix is to identify sequential skills to be taught to each child at each grade level. For each instructional objective, a grade level is indicated as to when the concept should be introduced, in what grades the skill should be reinforced, and when it should be expanded. Additionally, Corona-Norco has

developed specific lesson plans to support the objectives at each grade level. This approach provides a coordinated, articulated series of skills which build upon one another, and leads students to high-level use of technologies as tools.

Oak Park Unified School District (1995) includes a specific Staff Development Plan within their Technology Plan. They define specific goals and objectives of the staff development process, including allowing teachers to identify their own individual technology training needs. They also provide a research-based rationale for the different types of training situations they anticipate, including formal sessions, partnerships and study groups, peer coaching, and trainer of trainers mode. In addition, the plan makes recommendations for motivating teachers to become more proficient in their technology use, including district credit towards salary advancement, technology loan programs, and certificates of competency. The Oak Park Plan deals with the issue of staff training in a very thorough manner, making it the significant part of their overall plan that the research indicates it should be.

The California Technology Information Project provides technology plans which were successful 1996 School Based Education Technology Grant applications. Each of these plans provides an historical perspective on the school and its use of technology. Southside School District (1996) describes their student population, and explains what computer hardware and software they had in place prior to the creation of their Technology Use Plan. They also

explain that since their school-wide curriculum focus for Program Quality Review (PQR) is language arts, they will focus technology into that area as well. Elwin Elementary School (1996) provides a more complete statement of existing conditions, describing all technology and how it is used, including TV and VCR use. A statement of historical usage of technology is an effective way for schools to indicate their base level of implementation of technology (See, 1994). Readers of the TUP can get a sense of the schools perspective and background.

It is critical that Technology Use Plans are open to revision. A strong plan builds that revision process into the timeline of the TUP. Turkey Run Community School Corporation (1994), a winner in the First Annual Technology Planning Competition, recognizes the need for ongoing monitoring and evaluation of their TUP. The Turkey Run Technology Plan states, "Because no 5 year plan could possibly envision what technology might emerge, these goals, strategies, and actions are stated only as beginning points for program and curriculum improvement and will be continually evaluated and revised by the Team." Their goals and objectives reflect the need for ongoing evaluation of technology needs, tied to the educational needs of the students and teachers.

After reviewing the literature and analyzing existing Technology Use Plans, the author has created guidelines for the development of an effective TUP. The common elements of a strong Technology Use Plan are identified as

vision and/or mission, identification of educational goals, assessment of current usage, implementation, design of support systems, including infrastructure and training, funding mechanisms, and evaluation and revision. These elements, therefore, will be presented as necessary components of the TUP in this project.

CHAPTER THREE

STATEMENT OF GOALS AND OBJECTIVES

GOAL

The goal of this project is to provide a simple, easy to follow guide to elementary site technology leaders who are attempting to determine the role of technology in their school. There are several schools across the country who have implemented and integrated technology in outstanding ways, mostly through major grants and huge business partnerships. These schools have left the rest of America behind, and there is no road map for the rest of us to follow.

Obviously, there is no one particular formula for success. There is not one "correct" philosophy of how technology should be used in every classroom at every site. This project is, however, designed to allow for individual site differences and goals. It is simply a broad outline of steps that can lead to a better use of educational technology.

A Technology Use Plan, as described in this project, provides a strategy not just for hardware acquisition, but for training and supporting teachers in the long term. It defines the role technology will play in the curriculum, and gives schools a way to become an educational institution that meets the needs of the 21st century.

PHILOSOPHY

This model for creating a Technology Use Plan reflects the following philosophies:

- Students engage in challenging authentic tasks which develop over an extended period of time.

- All students utilize advanced critical thinking and problem solving skills.

- Students work both individually and collaboratively in heterogeneous groups.

- The teacher is a guide and mentor

OBJECTIVES

It is expected that this project will support school sites as they create a Technology Use Plan. It is also expected that schools which follow the guidelines presented in the project will have a TUP that meets requirements for most state and federal level grant applications. The objectives of the on-line manual entitled Creating a Technology Use Plan at the Site Level are as follows:

- Site technology leaders will understand the challenges inherent in the change process and in creating a Technology Use Plan.

- Staff members will be able to decide upon a common vision of educational technology within the school site.

- Staff members will be able to develop a series of goals and objectives detailing specifically what students and teachers will be able to do with educational technology.

- A Technology Planning Committee will be able to create an implementation plan based upon the goals and objectives determined by the total staff.

- A Technology Planning Committee will be able to develop a system of support for the Technology Use Plan which includes development of hardware infrastructure, staff development, and a plan for purchases, maintenance, and upgrades of equipment.

CHAPTER FOUR

DESIGN AND DEVELOPMENT OF THE PROJECT

DESCRIPTION

The on-line manual opens with a general statement of purpose, and a hyptertext table of contents, which contains nine links . A brief description is given of each link on the home page, so that technology planners can find the information they are looking for quickly and easily. The description is given in the form of questions which may be answered in that particular section.

Each web page first addresses the question: Why is this section of the Technology Use Plan important? Information is provided, based on the research in Chapter Two, as to why and how the information will improve the TUP. Each page also addresses the issue of how planners should write the section in their own TUP, including both suggestions regarding how to gather information, and possibilities for the actual wordsmithing necessary.

The first link on the table of contents, called "How to Use This Web Site", takes users to information on using this web site. Information is provided as to different ways a site might utilize the information provided, and details about downloading, duplication, and distribution are included.

The second link on the home page, "Research Information", takes readers to a summary of the research on constructivist learning theory, systemic change, and the role of technology in the change process. This

information will provide readers not only a philosophical background for the planning process, it will help to validate and encourage buy-in in the creation of the Technology Use Plan. References are provided for further research.

"Technology Planning Team", the following link on the table of contents, deals with the issue of selecting people to be responsible for creating the technology use plan. As supported by the research indicated in Chapter Two, this section recommends that the TUP be created by a team, representing a variety of interests and approaches to technology in the school environment.

The next link, titled "Creating a Vision Statement", takes readers to information about the creation of vision statements. In this manual, there are sample visions which reflect an insight as to the role that technology may play in the educational process. Each of the sample vision statements reflects the elements of good instructional uses of technology, as described in Chapter Two.

The fifth section, "Survey of Existing Conditions", links to information on determining existing uses of technology. The manual next provides guidelines for surveying staff to learn what technology exists, and how that technology is being used. This section of the on-line manual provides sample survey questions, as well as links to sample surveys, which can be used for reference or used "as is". The manual also instructs technology planners as to how survey results should be written into the TUP as a statement of existing conditions.

The next link in the manual, titled "Goals and Objectives", provides many

suggestions as to how technology can be used as an instructional tool, as well

as links to actual scope and sequence models delineating what students

should be doing with technology and when. Sample goals and objectives are

provided using two different approaches: grouped by type of technology usage,

and arranged by grade level.

"Implementation Plan", the succeeding section in the manual, provides

information on how to translate the goals and objectives of educational

technology into a reasonable implementation plan. This link takes users to

another table of contents, with links called "Infrastructure", "Staff Training",

"Purchases, Funding, Maintenance, Upgrades", and "Time Line".

"Infrastructure and Technical Support" addresses the hardware,

software, personnel, and knowledge necessary to meet the goals and

objectives of the Technology Use Plan. This page provides information and

links about physically networking a school, including a pre-networking survey

and specific wiring plans. Along with wiring issues, it briefly discusses

acceptable uses of the Internet, and provides links to sample Acceptable Use

Policies. It also discusses the information infrastructure requirements of a TUP:

knowing where to turn for support and advice.

The section entitled "Staff Training" deals with the need for effective staff

development in the area of technology implementation to be written into the

Technology Use Plan. The page defines effectiveness, in terms of staff

training, as being on-going, teacher-driven, and hands-on. The manual includes a matrix which details the characteristics of effective staff development.

In "Purchase, Maintenance, and Upgrade Plan", the manual suggests that each group of acquisitions should lead directly toward the vision and goals of the site. The purchasing plan should address such issues as connectivity, as well as installation, repair, and maintenance costs. The manual provides examples of the migration of equipment as higher levels of technology are acquired. In addition, this page provides links to grants and other funding opportunities for technology.

In the "Time Line" section, the manual provides guidelines to help technology planners prioritize which of the technology uses to meet their vision and goals are most important to them. The manual suggests that planners must determine which "necessary technologies" are currently most realistic, based upon existing infrastructure, teacher interest and training, level of support, and funding. The time line described in the manual when training will take place, the levels of implementation, and when evaluation and revision will be done.

The final section of the project deals with the issue of evaluation. In the section called "Evaluation and Revision", the manual indicates that schools must evaluate both their Technology Use Plan and their growth on a regular basis. This web page also details how schools can use the results of their

evaluation to revise their TUP. To help evaluate the Technology Use Plan itself, a link is provided to an evaluation matrix.

The project ends with a page of on-line references which provides links to the National Long-Range Technology Plan, along with various state, district, and site Technology Plan. Links are also provided to articles and other technology planning documents on the WWW, including projects similar to this one.

DESIGN

This web site, entitled "Creating a Technology Use Plan", was created using the Hyper-Text Mark-up Language (HTML) editor within Netscape Navigator Gold. A hard copy of the document can be found in Appendix A, and the disk copy of the site can be found in Appendix B. Each page within the site has been programmed to show the title "Creating a Technology Use Plan" within the Netscape Navigator location bar, as well as in the Microsoft Explorer title bar. The Netscape Gold HTML editor also embeds the authors name in the programming code.

The site has a simple, functional design plan. As supported by the research on web design in Chapter Two, this site has a common background, heading type, title, and style for all included pages. To ensure ease of use, all links are underlined, all unvisited links are the standard royal blue, and all visited links are purple. There are no graphics on any page, although

horizontal rules have been used to separate information. Tables have been used to create three dimensional borders around all headings. To focus attention on the headings and sub-headings, the font size is larger and the text is dark red.

Because monitors with lower resolutions can make background colors and patterns distracting, this site has a white background. Some of the pages are fairly text intensive, although no web page is more than three printed pages long. Colored text, varying font size and style, and white space have been used to lessen the negative impact of extensive text.

Each page in this site has a link at the bottom, which returns the user to the table of contents on the home page of the web site. In addition, pages within the "Implementation" section contain links back to that page. Some pages have internal targeted links. On the "Research" page, links are provided at the top of the page to each of the three sections within the page. In addition, there are targeted links to the references at the bottom of the page. At the end of each linked section, there is a return link which allows users to return to the top without scrolling. The advantage of internal targeted links in this situation is that users may print out the entire research section as one document.

Many pages have links to information on remote servers. Each link is given a descriptive name, which provides enough information for a user to determine if that particular site will be of value in their specific planning

process. In some instances, a more thorough explanation of what the user can expect from the remote site is given as well.

Tables and bullets have been used on some pages to help organize information more clearly. All tables have a common border and cell padding size, which helps ensure the overall uniform look of the web site. Where the information is organized in the form of a survey, the top row and left column have a blue background, to help clarify the purpose of the table. The tables have been designed to fit within the user's browser window, adjusting to the size of monitor.

This document will be posted on the Region 10 RIMS (Riverside, Inyo, Mono, and San Bernardino Counties) California Technology Assistance Project home page. In order to increase the number of people who are able to find this document, the author will register the project with search registries such as Yahoo and Magellan. In addition, the author will actively pursue reciprocal postings with those sites that contain links in this document.

FORMATIVE EVALUATION

This project was reviewed by three classroom teachers from Alvord Unified School District who have had experience writing Technology Use Plans at the site and the district level. They evaluated the project for content, aesthetic appeal, ease of use, and relevance. Each reviewer responded to a survey and provided their opinion of the project. Each reviewer read and

signed a consent form, a sample of which can be found in Appendix C. The originals are on file.

Each reviewer of this project was provided a disk which contained the HTML document. Two of the reviewers worked together on a Macintosh Quadra 660 with a fifteen inch monitor, using Netscape Navigator 2.0 as their browser. The other reviewer worked on a Packard Bell Pentium 75 desktop computer, using Netscape Navigator 3.0 as the browser. Each reviewer was provided a copy of the survey prior to using the web site, but was given no other direction as to how to review the project. Each reviewer spent approximately one hour reviewing the project and answering the survey.

In the area of content, all three reviewers felt that the project contained enough high-quality information for them to access when developing a Technology Use Plan. One reviewer suggested that the "Research" page should contain links to any on-line information, rather than simply citing the source.

In the area of aesthetics, one reviewer commented that the lack of graphics or other visual stimulation quickly became annoying, and suggested that photographs of student technology use be added to increase the aesthetic appeal of the web site. Another reviewer commended the lack of graphics, primarily because of the improved access speeds, stating that the functionality of the site was very appealing to him.

All reviewers agreed that the project was easy to use. One reviewer noted that she appreciated being able to count on a link back to the Table of Contents or other preceding pages. The internal targeted links were also mentioned as being easily understood. A reviewer noted that all pages "ended" in the same manner, so that it was easy to determine when the document had loaded completely. The reviewers did note, however, that part of their ease of use came from their familiarity with a browser, and that those with less experience may not know how to identify links, or where to look for return buttons.

In the area of relevance, all reviewers again agreed that the project was highly relevant to their needs and level of understanding of technology planning. One reviewer suggested that sites with no history of technology planning might not be able to use this project successfully, because the implementation level expected for technology is one that has to be developed over time. He felt that sites who are still at the acquisition stage of technology will probably be unable to relate to many of the concepts in this project, particularly those dealing with students learning as the focus of the Technology Use Plan. Other reviewers commented that some of the information provided in the links in the "Infrastructure" page was contradictory, and tended to reflect a t commercial perspective, rather than an educational perspective.

As recommended by the reviewers, the author created links in the "Research" section to those resources which were on-line. Within the

"Infrastructure" section, originally the vast majority of the links were to commercial vendors of network hardware. Based on the recommendations of the reviewers, the author removed those links that did not deal specifically with designing a total network, and ensured that all links provide information on more than one possible network solution.

To improve this web site in the future, the author plans to continue adding appropriate links to technology planning information. As users respond to the request for questions, comments, and other feedback, the author may modify the web site to reflect those considerations. Registering this site with various search tools, as well as reciprocal postings of links will be pursued. In addition, a version of this web site which contains a background pattern, graphic buttons, and other pictures will be developed as a parallel site, so that users can choose the graphic version **or** the text version.

STRENGTHS OF THE PROJECT

This project provides a broad outline of how to write a Technology Use Plan. The scope of the project means that the majority of it will be relevant to the majority of school sites which use it. The samples included in the project help to ensure that schools do not have to "reinvent the wheel" as they work towards an effective Technology Plan. The links provided are to well-established sites, which helps to ensure that they will remain current.

The design of the project makes it quick to load and simple to print or download for editing. The commonality of the pages allows users to find expected information easily. The step-by-step format seems to appeal to those technology planners that approach tasks in an organized, structured manner.

LIMITATIONS OF THE PROJECT

No guidebook can address all of the unique situations that exist in schools, and this manual is no exception. Schools with certain specialized needs, such as those in remote locations or those with exceptional populations, may find this document limited in its scope. Additional or contrary requirements may be imposed by district, state, and county regulations in other states and regions.

Although every effort was made to add color and appeal, the design of the project dictates that the pages of the web site are not especially aesthetically appealing. The lack of graphics and the similarity of format may prove frustrating for those technology planners that prefer more visual stimulation. The step-by-step format appears to seem overly rigid to people who approach tasks in a more intuitive manner.

Because of the rapid advances in technology information available on the Internet, it will be difficult for this site to remain current. Without regular maintenance, this site could easily become obsolete within a year. Links and

other information must be updated in a timely manner for this document to retain its relevance.

The stability of the Web address may also prove to be a limitation of this project. Posting a site to the World Wide Web requires the author to find an owner of a server that is willing to sponsor this project, providing space on their web server and allowing the bandwidth for people to access the site. Although the California Technology Project has agreed to post this project at this time, changes in their circumstances in the future, relative to space on their server, may dictate that this project will be removed.

Creating a Technology Use Plan: Hard Copy

Creating a

Technology Use Plan

This web site provides specific guidelines for a school site to use when creating or revising their Technology Use Plan. By following the steps contained in this site, your school will be able to develop a coordinated, articulated TUP which explains exactly how you expect to use technology to improve learning.

Table of Contents

How to Use This Web Site   How do we use this site as a planning tool? How do we find specific information?

Research Background   Why should we use technology in the schools? Why do we write a Technology Use Plan? How do students learn better using technology?

Technology Planning Team Who will write our Technology Use Plan?

Creating a Vision Statement How do we begin writing a Technology Use Plan? How do we focus our energies?

Survey of Existing Conditions How do we know what we have, and what we can do? What do we need to learn to use technology better?

Goals and Objectives What will we do with the technology? What skills will we expect our students to have?

Implementation Plan How do we connect to a network? What training will we need? How will we fund and support our plan? How will we make sure that students are using the technology effectively?

Evaluation and Revision How do we know how we are doing? How do we improve our plan?

References Where can we go for more information and examples of existing Technology Use Plans?

How To Use This Web Site

Why should we use this site? This site is designed to be a comprehensive guide to creating a Technology Use Plan. By following the steps in this document, you will be able to create an effective TUP that meets generally accepted standards. The web site includes many links to outside resources, which will provide you with additional information and options.

How do we use this web site? This entire web site may be duplicated and distributed within schools and school districts, with appropriate credit given. You may print the pages of this document, or download the entire document to your computer. Any of the surveys and forms contained in this survey may be used as they are, or modified to meet your particular needs.

If you have questions or comments regarding this site, or have used this document to help write your Technology Use Plan, please e-mail the author, Molly Carbo.

Research Background

The creation of the Technology Use Plan, as described in this web site, is based upon research in the areas of:

- constructivist learning theory
- systemic change
- effective uses of educational technology

Note: all numbers link to the references at the end of this page.

Constructivist Learning Theory:

Constructivist learning theory indicates that students learn best through meaningful interactions with the world around them, which develops critical thinking and problem solving skills. By arriving at a personally meaningful understanding of issues, students become adept at the learning process, and find learning to be motivational and rewarding ([1]). Principled changes in the curriculum are needed to improve our nation's schools, and effective technology must be a part of these changes ([6]).

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Systemic Change:

It is the goal of American education to prepare children to be involved and productive citizens of the future. All students should be equipped to succeed in a fluid, information-rich society. A new way of educating is necessary to meet the new forms of work needed in the business world of the near future ([5]). More importantly, new approaches are needed to meet the needs and concerns of our students, and to prepare them for active citizenship in a global, information-rich

society (<u>8</u>).

Educational reform comes from the realization that current instructional systems are not adequately preparing students. A major revolution in the way instruction and assessment are performed has begun. This reform effort is being driven both by grassroots efforts and by national and state policy changes. Educators are looking for a new kind of school to meet the educational challenges faced by today's students. They are looking for a school "designed for learning, rather than teaching" (<u>4</u>).

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Effective Uses of Educational Technology:

Throughout the educational system, however, there is a lack of awareness of effective uses of technology in today's schools (<u>6</u>). This system-wide failing has left American schools behind in a technology-rich environment. Technology is a critical element for student achievement of world class standards, allowing students to access information, manipulate data and express ideas to an authentic audience (<u>2</u>).

Too often, technology is simply seen as an additional subject, or an add-on to the regular set of instructional objectives. The effective use of technology, however, can support and promote new educational systems involving student-centered classrooms, interactive instruction, real-world problem solving, and multidisciplinary studies (<u>7</u>). The goal of technology in the educational system is to improve all types of teaching and learning through the infusion of technology. Technology infusion, however, must be planned for, so that it is an integral part of the instructional goals and is integrated into the curriculum.

The Technology Use Plan (TUP) is an integral part of effective school improvement plans. It does not exist in isolation, rather, it is a part of the school's comprehensive plan for student learning. Despite the fact that most schools now own computers and other technology, many districts and schools do not yet have current, comprehensive technology plans as a component of their statement of educational goals.

The Technology Use Plan is really a misnomer. The goal of the Plan is not to specify how to use technology; rather, it is to determine how technology will be used to support curriculum and educational goals. Technology tools must be

integrated into the regular curriculum in a manner that helps improve student's understanding of instructional concepts and themes (2). The plan should include not only provisions for technology applications which will help students to meet instructional objectives, but also provisions for teaching students how to search for relevant technology applications on their own. Ideally, technology should be a transparent part of the curriculum. At the highest level of technology implementation, students have access to and knowledge of a variety of technology tools, and they use those technology tools to solve authentic problems. In the ideal Technology Use Plan, technology is presented as a vehicle for "information queries, problem solving, and/or product development" (3).

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Sites for additional information:

EdWeb: Exploring Technology and School Reform

Return to Table of Contents

References:

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Selecting a
Technology Planning Team

Why do we need a Technology Planning Team? It is sometimes easier, when you want something done, to simply do it yourself. But with the creation of a Technology Use Plan, that can be a disastrous mistake. A Planning Team which represents a range of interests in the school community may work more slowly than just one person writing a plan on their own. The significant difference comes when it is time for the staff to "buy in" to the Technology Use Plan... if they do not feel that their interests have been heard and addressed, they are unlikely to provide the necessary support for the plan to be a success.

Who should be on the Technology Planning Team? Any member of the educational community (including parents, students, business partners, teachers, administrators, and other staff) that has an interest to be on the team should be eligible. The participation of at least one representative from similar grade levels or departments, including at least one "techie" and one person who is fairly unfamiliar with technology, helps to ensure that a range of interests are being addressed. Parents and older students can provide valuable insight from different perspectives. Administrative input is critical, because the support of the principal is a significant factor in the success of the plan.

In general, the larger the committee, the slower it moves. Try to keep the core planning team to no more than eight, but if you have more people that are truly interested and committed, provide opportunities for their input as well. Assigning research jobs to these interested people will allow them to be valuable contributors to the development of the plan. Turning over the staff development portion of the plan to a knowledgeable sub-group, for example, allows more people to be directly involved.

Remember, the more people who are aware and involved at the planning stage, the more who will rigorously support the final Technology Use Plan!

Sample Elementary Planning Team:	Sample Departmentalized Planning Team:
• Teacher representing grades K-2 • Teacher representing grades 3-4 • Teacher representing grades 5-6 • Teacher representing exceptional children • Principal • Parent • Classroom Aide	• Teacher representing English, Social Science, Foreign Language • Teacher representing Math and Science • Teacher representing Health, Physical Education, and Athletics • Teacher representing elective departments • Teacher representing exceptional children • Counselor • Principal • Parent • Student

Vision Statement

Why do we need a vision statement?   All plans begin with a vision. Without a vision of what technology is supposed to do, there is nothing to plan for! In education, the primary focus of that vision must be learning. The vision statement of a Technology Use Plan must show how the members of a school community see technology as improving teaching and learning. The vision statement needs to reflect the general sense of purpose of the entire school, including parents, students, teachers, administrators, and other staff.

How do we write a vision statement?   A vision statement for technology use might be written as a subsection of the mission statement for the school, or it might be incorporated into the actual mission statement. Regardless, the primary focus of the vision must be learning, and there must be a statement as to the role that technology will play in the educational process.

There are some key "buzz words" that are common to most technology vision statements: *life-long learners*, *access to the information age*, *integration across the curriculum*, *collaborative learning experiences*, and *critical thinking and problem solving skills*.

To write your mission statement, begin by brainstorming some things you envision students doing with technology. Then take a look at vision statements from other schools and districts. There may be ideas in other vision statements that appeal to you.. add them to your list. (No, that isn't cheating!) Next, in teams of two or three, write a statement that reflects as many of the things you envision as possible, without listing them directly. Use the buzz words above, or any others that your district is particularly fond of. Work as a group to come to consensus on a vision statement that best reflects everyone's beliefs about technology's role in education.

The final step is to share the vision statement with others at your site. Be prepared for modifications: many people will want to make minor changes, or add their own perspective. Within the planning team, try to address the modifications. The more people that feel a part of the creation of the vision

statement, the better the buy-in will be, and the more likely the Plan will be successful.

Sample Mission / Vision Statements -

- **School of the Future (ERIC document, #ED354051):** The mission of the school is to provide a unique learning environment involving educators, parents, students, the university, and business in a collaborative partnership. The school will employ a host of technologies, especially computers, across the curriculum to focus on creative approaches to independent research, problem solving, and other strategies, leading students to become independent thinkers and learners.

- **Bellingham Public Schools (1993):** The mission of this school district is to move this community and its life-long students forward into the new age of technology. To provide access and the knowledge to use this access in connection with the new Information Superhighway. To install the portal through which the people of our district will pass to link with visionary developments. To become the needed vehicle between the education of today and the technology of tomorrow.

- **Burbank High School (1996):** In keeping with the mission of the Burbank Unified School District and Burbank High School, this school is committed to graduating students who possess the skills needed to succeed in an increasingly complex information society. In this new information age, the ability to gather and distribute information through electronic communication is vital. Therefore, Burbank High School's vision is to graduate students who are comfortable with and proficient in using educational technology in all its forms as information resources and who possess the skills to interact with individuals or organizations and agencies through computer telecommunications.

- **Corona-Norco Unified School District (1996):** Staff, students, and community are committed to meeting the needs of the school district's K-12 students by providing an effective educational technology program that will improve and broaden student achievement through shared decision making by using technology as the objective of instruction, the medium of instruction, and as an application tool, meeting the expectations of district and state guidelines.

Additional Vision Statements may be found in the on-line Technology Use Plans in the Reference section of this document.

Survey of Existing Technology Use

Why do we administer a survey?   Before you can write a meaningful plan, you must determine what you have and how it is being used. The results of this survey will be written as a "Statement of Existing Conditions" in your final document. One key reason for this type of survey is to provide a baseline for your evaluations in coming years.

A survey of **how** technology is currently being used is necessary. This includes determining what hardware and software are being used, what curricular area (if any) such use is tied to, and the frequency of use. This can be a rather delicate survey, because some teachers may feel defensive about not using technology, or about the way in which they do use technology. It is therefore important to stress that this survey is simply designed to list current usage, not to evaluate the teacher or his/her teaching methods.

A survey of **what** technology exists in the school may also be useful, especially if your inventory and tracking system have been less than perfect. It is important to remember that technology is more than just computers. It includes both hardware and software, laserdiscs, video cameras, CD-players, audio recorders, overhead projectors, and VCRs. It is a very good idea to note the brand, model or style of these items as you create your inventory.

How do we use the survey?   Since schools function with limited resources, it is critical that technology be utilized as effectively as possible. By identifying how technology is currently being used, the planning committee can determine what needs to be done, if anything, to improve existing utilization.

Generally, the results of the survey of technology use is written in a narrative form, and is general rather than specific. The survey of technology equipment should be written as a detailed list of equipment by type and should inlcude where those items are currently housed, for future reference.

An attitude survey can provide valuable information about the readiness level of staff members when it comes to the implementation of technology. Results of

the survey can help you determine the direction staff development efforts ought to take.

Sample Surveys:

How do you use technology in your job?	- Records Management - Classroom Management - Classroom Instruction - Administration - Information Access / Communication - Not at all
How do you acquire new technology skills?	- Self taught - Inservice Activities - Onsite resources - Outside resources - Other _____ - N/A
Rate yourself as a general technology user (VCRs, camcorder, laserdisc player)	- Do not use technology - Seldom use technology - Regularly use technology - Expert user of technology
Rate yourself as a computer user.	- Do not use computers - Seldom use computers - Regularly use computers - Expert user of computers

Where would you like to rate your technology use in five years (including computers)?	• Do not use technology • Seldom use technology • Regularly use technology • Expert user of technology
What is stopping you from growing in your technology use?	• Funding • Geographic Location of technology • Staff training/activities • Technology support • No interest
What is available to support technology usage at your site?	• Material • Outside resources • Personnel • Equipment • Facilities

In addition, your survey should include information about specific technology use, both by staff members and by students. A table similar to the one below could be used as an indicator of **in-school** technology use by staff or students.

Technology	Not Available	Not Used	Seldom Used	Regularly Used	Expert User
MS-DOS operating system					
Windows operating system					
Apple II system					
Macintosh system					
Other system					
CD-ROM drives					
VCR/Television					
Laserdisc players					
Internet Connection					
Camcorder					
Video Editing Equipment					
Telecommunications / Distance Learning					
Local Area Network					
Instructional Television (ITV)					
Printers					
Scanners					
Word Processing					
Presentation Tools					
Multimedia					

Other technology surveys:

Detailed Survey of Technology Use

Mankato Internet Skill Rubric - tests personal use of the Internet, including e-mail, newsgroups, ftp, search tools, and on-line ethics.

Highland Park Elementary, Texas - Survey of attitudes and use of technology

Richardson, Texas School District - Statement of Existing Conditions

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Goals and Objectives

Why do we include specific goals and objectives in our Technology Use Plan?   The purpose of the Technology Use Plan is to answer the question: What, specifically, are you going to do with the technology? It is critical that the curricular goals in the TUP extend the goals already in existence for each subject area. The Planning Committee needs to first consider the most common ways technology may used within the educational setting. Then, specific goals and objectives must be written.

How do we write goals and objectives for technology use? Goals for educational technology will generally fall into one of the following broad areas: communication, information processing, productivity, curriculum integration, and training and staff development. The goals are a broad statement of how you see technology helping you fulfill your instructional objectives in general. Objectives are specifics of what your will do to meet your goal.

To make the TUP easier to follow, it may be helpful to group goals that fall under the same broad curricular area or that use similar skills. Another possible way to order goals is to put the goals in a sort of devlopmental order, with the goals your site is close to reaching first, and those that require a significant amount of time, training, and/or money to implement at the end.

Sample Goals and Objectives, grouped by type of technology use

Other sites containing specific goals and objectives:

- Bellingham, Washington Technology Plan
- Utah Information Technology Scope and Sequence by grade level
- Technology Scope and Sequence: School District 71, Comox Valley, B.C.

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Goals and Objectives

Sample Goals and Objectives, grouped by type of technology use:

Computer Assisted Learning (drill and practice, simulations)

- Sample Goal: Students will use technology to increase their skill and understanding in the content areas through the use of drill and simulation software.
- Sample Objective: Students will use simulation software to increase their understanding of westward expansion.

Application Software (word processing, database, spreadsheet, graphics)

- Sample Goal: Students will communicate effectively through application software.
- Sample Objective: Students will word process and edit a document.

Storage and retrieval of information (searchable database, CD-ROM, Internet)

- Sample Goal: Students will use a variety of research tools to discover primary and secondary sources related to curricular report topics.
- Sample Objective: Students will use search strategies to retrieve information from the Internet.

Telecommunications (e-mail, voice mail, Internet)

- Sample Goal: Students will share information with students at remote locations.
- Sample Objective: Students will compose and send e-mail related to curricular projects..

Presentation of information (multimedia)

- Sample Goal: Students will communicate visually, graphically, and artistically through multimedia presentations.
- Sample Objective: Students will create a video presentation exploring the completion of the trans-continental railroad..

Teacher productivity (gradebook, automated attendance)

- Sample Goal: Teachers will use the computer in the classroom as a management tool.
- Sample Objective: Teachers will keep student grade information using a spreadsheet or grade management software.

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Implementation Plan

How do we make it all work?

Infrastructure What physical infrasture is necessary for optimum technology implementation? What other things must we take into consideration?

Staff Training How do we learn the skills necessary to implement effective technology use? How can we make sure our staff development time and money are used to our best advantage?

Purchases, Funding, Maintenance, Upgrades What is necessary to keep our technology up-to-date and working well to meet our goals? Where can we find the money to pay for the technology we want?

Time Line How do we decide what our first priority should be?

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Infrastructure and Technical Support

What is infrastructure? Infrastructure refers to the hardware, software, personnel, and knowledge necessary to meet the goals and objectives of the Technology Use Plan.

The most common usage of the term infrastructure refers specifically to the networking capabilities of a site. Wiring plans should be written by an expert who takes into account wiring and other hardware specifications as they apply to the educational setting. All wiring and hardware should generally be compatible with district specifications, and may even be a part of a district wiring plan.

Another common usage of the word infrastructure refers to the levels of support for technology. This infrastructure is informational, rather than physical. It is important for schools to develop an informational infrastructure, in which they are a part of a group working towards a common goal. When you need a certain expertise, it is helpful to be able to turn to your informational infrastructure for support and advice. People in this informational infrastructure might include teachers and parents, as well as staff from other sites, business partners, and government officials.

What factors should we take into consideration when wiring schools?

If you are wiring your school in such a way that teacher and/or students have access to a network in general, and the Internet in particular, it is important that an Acceptable Use Policy (AUP) is part of your Technology Use Plan.

Students need to be aware that there are acceptable and unacceptable uses of the Internet and other networks. Legal and ethical issues should be a part of the curriculum at every grade level. In addition, learning to evaluate sources for bias and accuracy teaches students to be mature consumers of information. It is important that the school requires students and their parents to be responsible users of network technology by having them sign an Acceptable Use Policy. The AUP sets the standards users must follow when using an intra-school network,

or when accessing remote locations through the school network. Most AUPs are divided into five sections: general statement of purpose, acceptable uses, unacceptable uses, consequences, and a signature form.

Sample Acceptable Use Plan

AUPs on the WWW

Sources of Networking Information:

- Pre-networking Survey Helps you determine what you must know before you begin designing your network.
- How to Choose the Right Computer Network This site provides extensive technical information on the many types of computer networks currently available.
- Web66's Network Construction Kit Basic overview of LANs and WANs for beginning networkers.
- Design Guide for School Networks Everything you need to know to set up a school network.
- Building a School Network A guide for school sites, focusing primarily on the Macintosh platform.
- Big Lan FAQ Answers from the BIG-LAN mailing list, dealing with technical issues such as protocol and cable.
- State Networking Project Includes statistics on schools and districts which are currently on-line, as well as some general connectivity issues and problems you might encounter.

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Acceptable Use Policy

"The power of a democratic system to adapt to change is vastly strengthened by the freedom of its citizens to choose widely from among conflictiing opinions offered freely to them."
~Library Bill of Rights

General Statement of Purpose:

Any person accessing this network agrees to the terms and conditions outlined in the operating rules below.

This network is established for the educational and professional use of students, faculty, and staff. The use of this network must be in support of learning, education and research goals and objectives, whether the learning is self directed or as a part of a structured class experience. By providing this service to students, faculty and staff, the school (district) intends to promote educational excellence through resource sharing and collaboration.

The school (district) connection provides direct access to the Internet. Through the use of the Internet, we expect students and staff to be able to communicate and share information with individuals or groups throughout the world, access and use information sources from remote locations, and significantly expand their knowledge base.

Connections to computers and people all over the world can allow material that is without educational value to be accessed. It is the users responsibility to use the Internet in an ethical and legal manner. Users (and parents of students who are users) must understand that it is impossible for the school (district) to monitor all of the data that is available. Some of the information available is controversial, and may be inappropriate or offensive. The school (district) does not condone the use of such materials.

Users may encounter material which is controversial and which users, parents, teachers or administrators may consider inappropriate or offensive. However, on a global network it is impossible to control effectively the content of data and an industrious user may discover controversial material. It is the users responsibility not to initiate access to such material. Any decision by the district to restrict access to Internet material shall not be deemed to impose any duty on the district to regulate the content of material on the Internet.

Electronic mail may be used for any legal and ethical purpose.

Acceptable Uses

The use of this account must be for educational and research activities, and be consistent with the educational objectives of the school and district. Students are expected adhere to the same standards which they are held to elsewhere in the school (district) community. The rules for this network conform to the guidelines of the broader rules and expectations of the school.

1. Exercise good judgement in visiting sites. Do not visit sites which appear to contain objectionable material. Ask a teacher if you are unsure if the site is appropriate.
2. Be polite and use appropriate language on all on-line communications. Avoid jokes or statements that might offend people.
3. Ensure personal privacy by not giving out name, address, or phone number. Respect the privacy of others by never trying to access other people's files or mail.
4. Never delete or change any application or file belonging to the network or another person.

Unacceptable Uses:

Illegal and unethical behavior is prohibited, as is behavior that is not consistent with the goals of this educational institution. The following behaviors are specifically disallowed:

- Slander and Libel
- Vandalism
- Invasion of Privacy
- Theft
- Copyright Violations
- Harassment
- Inappropriate Access
- Chain Letters
- Commercial Activities

Monitoring / Consequences

The school (district) reserves the right to limit, suspend, or terminate access privileges to any user at any time. The school (district) reserves the right to review any material on user accounts and to monitor fileserver space in order to make determinations on whether specific uses of the network are inappropriate. Any user violating these rules, applicable state and federal laws or posted classroom and district rules is subject to loss of network privileges and any other disciplinary actions deemed appropriate by the school (district).

Agreement Contract

Each person who has access to the school (district) network should have a completed Acceptable Use Policy Contract on file. When students have access to the network, the form should be signed by the student, the parent, and the teacher.

Student: I, _____, have read and understand the Acceptable Use Policy and agree to all of the provisions. I will exercise responsible behavior when on the Internet. I understand that any violations of the above guidelines will result in immediate suspension of my Internet privileges, and further disciplinary measures may be taken as well.

Parent: I, _____, as the parent/guardian of the above named student, have read and understood the Acceptable Use Policy and I hereby give permission for my son/daughter to use the Internet. I understand that this access is designed for educational purposes, and that my child is required to follow this policy. I further understand that there is a potential for my son/daughter to access information on the Internet that I may consider inappropriate and that reasonable effort will be made on the part of the instructor to restrict access to such information, but that my son/daughter is ultimately responsible for restricting himself/herself from inappropriate information.

Instructor: I, _____, request the above named student be given network access. I understand that the Internet is a reference tool to be used in conjunction with other resources to complete the curriculum goals.

Sample wording provided in this document was compiled from various Acceptable Use Policies available on the World Wide Web. The following sites provide further examples of AUPs that have been adopted:

- General info on AUPs by Internet School Networking Group
- Washington School Information Processing Cooperative
- Telis Acceptable Use Policy
- Hawken School Computer Network
- Fraser Valley Community Information Society
- Davea Career Center
- Los Angeles Unified School District Information Technology Division
- Kings County Office of Education
- Blach Middle School

Training and Staff Development

Does this sound familiar? One teacher takes a two-day training on one specific software package (which may or may not actually exist at the school site). That teacher then presents everything they learned to the staff as a 15 minute segment of the monthly staff meeting. With staff development practices such as these, it is hardly surprising that so much educational technology sits idle in the classroom!

Why do we plan for staff development?
The single greatest indicator of successful implementation of technology into the curriculum is teachers' positive attitudes and skill in use. This indicates that a significant portion of our technology planning must take staff development into consideration. Staff development, like the other areas of the TUP you have written, is most effective if it is coordinated and clearly articulated to tie into technology goals and objectives.

How do we design staff development for technology?
Effective staff development means offering on-going, hands-on training to teachers in the technology they will use in the classroom. Quality staff development is driven by the staff. When teachers determine for themselves what they need to learn, there is a positive feeling of ownership in the staff development, and a greater likelihood that the skills and information from the training will be retained, internalized, and integrated.

Effective staff development can not be a "one-shot" occurrence. It must be a process:

- Technology training introduces teachers to technology concepts and skills.
- Continuous practice of skills gives teachers a chance to internalize their new skills and become comfortable with technology use. This brings up a side issue: It is a waste of time and money to train people on technology they have no access to.
- Peer coaching and collaboration let teachers share ideas and insights as to how to implement the technology into their own unique situation. The ability to collaborate on the implementation of technology skills is the number one indicator of success!

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- Technical support is critical to the success of a staff development program. Especially at the beginning of the learning curve, the teacher's focus must be on implementation of the technology, not on maintaining the equipment. Therefore, keeping the technology functioning at its optimal level is at least tangentially related to the staff development process.

Characteristics of Successful Staff Development

Facilitators	- Secure - Part of the group - Use lots of praise - Encourage participants to construct their own meaning - Follow up with participants regularly (monthly or bi-monthly)
Participants	- Volunteers who want to attend the training - Part of a team that works well together - Represent a variety of positions (teacher, administrator, parent) - Have access to the technology they are being trained in
Environment	- Work stations available for each participant or team of participants - Comfortable atmosphere - Time for exploration of technology - Collaboration and sharing is encouraged, both in using the technology and determining how to effectively integrate it into the classroom
Content	- Based on curricular needs of the teachers - Emphasis on immediate classroom use - Demonstrates positive impact on student learning - Software use is taught within a curricular area, rather than in isolation

Other Staff Development Resources:

- The JASON Foundation for Education

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Purchase, Maintenance, and Upgrade Plan

When purchasing technology, each group of acquisitions should lead directly toward the vision and goals of the site. This means that you do not purchase computers without the necessary software! Digital cameras, which might be used to capture images of student work for Internet publication, require video in/out cards on the computer. The purchasing plan should address such issues as connectivity, as well as installation, repair, and maintenance costs.

Why do we plan for purchases, maintenance, and upgrades? Unless your school has found some type of on-going funding bonanza, the issue of how to pay for technology purchases is a very important part of the Technology Use Plan. Historically, technology has been an add-on; something that was purchased with one-time monies such as lottery funds or grants.

Your Technology Use Plan, however, changes that. It makes technology a priority in how teachers will teach and how students will learn, which means it must be a part of the regular instructional budget. Just as schools have a line item budget for textbooks, library materials, and other instructional supplies, they must budget for technology.

How do we plan for maintenance and upgrades? The one thing you can rely on is that technology is developing so fast that it is impossible to keep up with. By writing goals and objectives that focus on the learner, you have given yourself the opportunity to purchase whatever technology best meets those needs when the time comes to buy. You are not locked in to a certain brand or model.

As you purchase new technology, however, decisions need to be made about older equipment. Is is useless because it is no longer state-of-the-art? Can it still be used to meet some goals and objectives called for in your plan? If not, can it be economically upgraded so that it **will** meet those needs? If nothing else, can

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it be used at another site, or broken down for parts? A plan that deals with what will happen when technology becomes outdated will find you prepared for these issues.

Migration of technology means moving equipment to areas of less intense usage when it becomes outdated. For example, if one primary goal for seventh and eighth graders is to produce multi-media presentations of content knowledge, there is a need for fairly powerful, connective equipment. If a goal for third and fourth graders is to use word processing and HyperStudio to create a presentation, less powerful equipment may serve their purpose. If kindergarten and first grade students are using interactive books on CD-ROM, they need speeds that keep the experience from becoming frustrating. Sixth graders accessing encyclopedia information from CD-ROM may be better able to cope with slightly slower speeds. All working technology you have available can be useful in some way. Find that use, and you have developed a plan for migration of technology.

To keep your technology current, and provide the opportunities you wish to provide for your students, other funding strategies may need to be developed. A plan for aggressively seeking grant opportunities, as well as for building community partnerships belongs in the funding section of the TUP.

Sites that offer information about grants and other funding sources:

- Quest: NASA's K-12 Internet Initiative
- Resource Guide to Federal Funding for Technology
- Yahoo: Registry for Education; Grants

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Creating a Time Line

Why do we include a time line?   A time line is a graphical way to illustrate your school site's priorities. It shows where the plan is going, and what steps will be required to get there.

How do we write a time line? A time line should include:

- Which goals will be addressed first, second, third, etc.
- When training will take place
- When purchases will be made
- When evaluation and revision will be done

Unless your school has discovered a funding bonanza, it will be impossible to purchase all of the components called for. In any case, since it takes time to train teachers on the use of new technology, there is no point in purchasing everything at once. When prioritizing, each site (or district) must determine which of the technology uses to meet their vision and goals are most important to them. They must also determine which "necessary technologies" are currently most realistic, based upon existing infrastructure, teacher interest and training, level of support, and funding. Another way to approach prioritizing is to look at the most important long range goal, regardless of cost. The short term goal, in such a case, would be to ensure that all of the components, including infrastructure, training, support, and funding are addressed first.

Technology Use Plan Time Line:

- Cupertino Union School District

Evaluation and Revision

Why do we need to include a section on evaluation and revision? If you have been following the steps provided in this web site, you have probably created a Technology Use Plan that effectively meets your needs, at least for right now. A truly effective Technology Use Plan, however, plans for the future by recognizing that your vision, goals, and objectives may change, as might your staff development needs, infrastructure plans, and timelines. Therefore, an effective TUP contains a method for evaluating both the plan and the results of the plan, and a system for revising and improving it.

It is also a good idea to do yearly "status reports" which show what progress has been made and which areas need further attention. This accountability makes the TUP more credible in the eyes of those who doubt the usefulness of the document.

How do we evaluate our Techology Use Plan? When you finish writing your TUP, before you publish it, you need to make sure that the objectives of a TUP are met. A good Technology Plan:

- looks at both long term and short term goals.
- Focuses on what students will do with technology before what technology is needed.
- Stresses integration; technology as a tool rather than being simply a product that "enhances" regular instruction.
- Includes many different types of technology.
- Includes a staff development plan.

Minimum standards of a Technology Use Plan was developed to evaluate the readiness of a district for technology grant applications and implementation of infrastructure.

How do we evaluate our growth for the year? The simplest method of evaluation is to re-administer the survey you did early in the planning process. This will show changes in attitude and comfort level, and will also help you determine teachers' wants and needs for the revision process.

Another evaluation tool is to have your team examine each goal and objective, asking:

1. Has this goal been met?
2. Is this goal still valid?
3. Do we want to keep, modify, or delete this goal?
4. Have our priorities changed?

How do we plan for revision? After taking a year-end survey, your needs for staff development for the following year should be clear. Rather than planning staff development for the next three years, simply write into your plan that you will evaluate your needs each Spring, and plan your staff development for the following year accordingly.

To revise your timeline, you will evaluate the goals, objectives, and priorities, then modify your timeline to reflect any changes. Be aware that few schools are able to stick to the timeline they set themselves in the first year, let alone over a three to five year period. Don't feel bad if you only got to half of the things you had hoped to accomplish: you are still making progress, and your goals are clear. In your evaluation, acknowledge your successes, no matter how small, and keep the tone positive. You will feel better and encourage more people if you focus on the positive, especially in written statements of evaluation.

Other evaluation resources:

- RISD Measurement of Technology Standards

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Minimum Standards for Technology Use Plans

It is recommended that school sites use these statements of minimum standards after they have completed the first draft of their Technology Use Plan. Use of this matrix may help school sites discover the strengths and weaknesses of their TUP.

Vision and Originality	Clearly stated vision of how equitable access to technology will support classroom teaching and learning experiences Explains why technologies chosen are the correct tools to meet educational needs. Activities described show sound innovative approaches to structuring of: • curriculum • classroom instruction • classroom management. Vision and activities indicate student centered teaching methods which improve student learning and effective classroom structure.

Technology Integration	Technology used as a tool to support learning in core curriculum areas. Proposal incorporates varied uses of technology (laser disks, CDs, VCR, TVs, overheads, LCD panels, video cameras, computers, etc). Plan takes full advantage of the communications and information retrieval capabilities of: • Internet • Library resources • Universities • Other technologies
Outcomes and Assessment	Goals, outcomes, and assessments are well defined and clearly linked Goals, outcomes, and assessments are linked to State Frameworks Measurement tools are clearly described. Clearly defined articulation of expected outcomes between schools and grade levels. Ongoing review of technology usage.
Collaboration	Statement of how and when teachers will be given opportunities to collaborate in the development and implementation of curricular uses of technology. Examples of student interaction and collaboration.

|	
Professional Development and Support	History of professional development related to the integration of technology into the classroom. Plan for on going professional development related to integration of technology into the classroom. Proposal includes realistic appraisal of what is necessary to successfully integrate technology into classrooms.
Timeline	Clear plan for ongoing maintenance, funding, and support of the infrastructure. Contains a sequential plan for implementation of technology into the schools. A well defined hardware utilization plan which addresses flexibility, longevity, upgradability, and scalability.
Security	Clearly defined security plan.

On-Line References

The following resources represent some technology planning information available on the web. Every effort is made to ensure that these links are current. If you encounter a problem, or know of a site you feel should be included on this list, please e-mail the author.

- National Long-Range Technology Plan
- Technology Planning: Recipe for Success
- Smart Valley, Inc. Technology Planning Guidebook
- Choosing and Using Educational Technology
- Natonal Center for Technology Planning
- Technology Plan Archives for Northwest States
- Schools Project (University of Illinois)
- California Grant-winning Technology Plans
- Richardson (TX) Independent School District Technology Plan
- Indicators of High Technology Performance
- The Switched-On Classroom
- British Columbia Technology Planning Guide
- Public Schools of North Carolina
- From Now On: The Educational Technology Journal
- EduTech: Educational Technology and Resources
- EdWeb: Exploring Technology and School Reform

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APPENDIX B

Creating a Technology Use Plan: Disk Copy
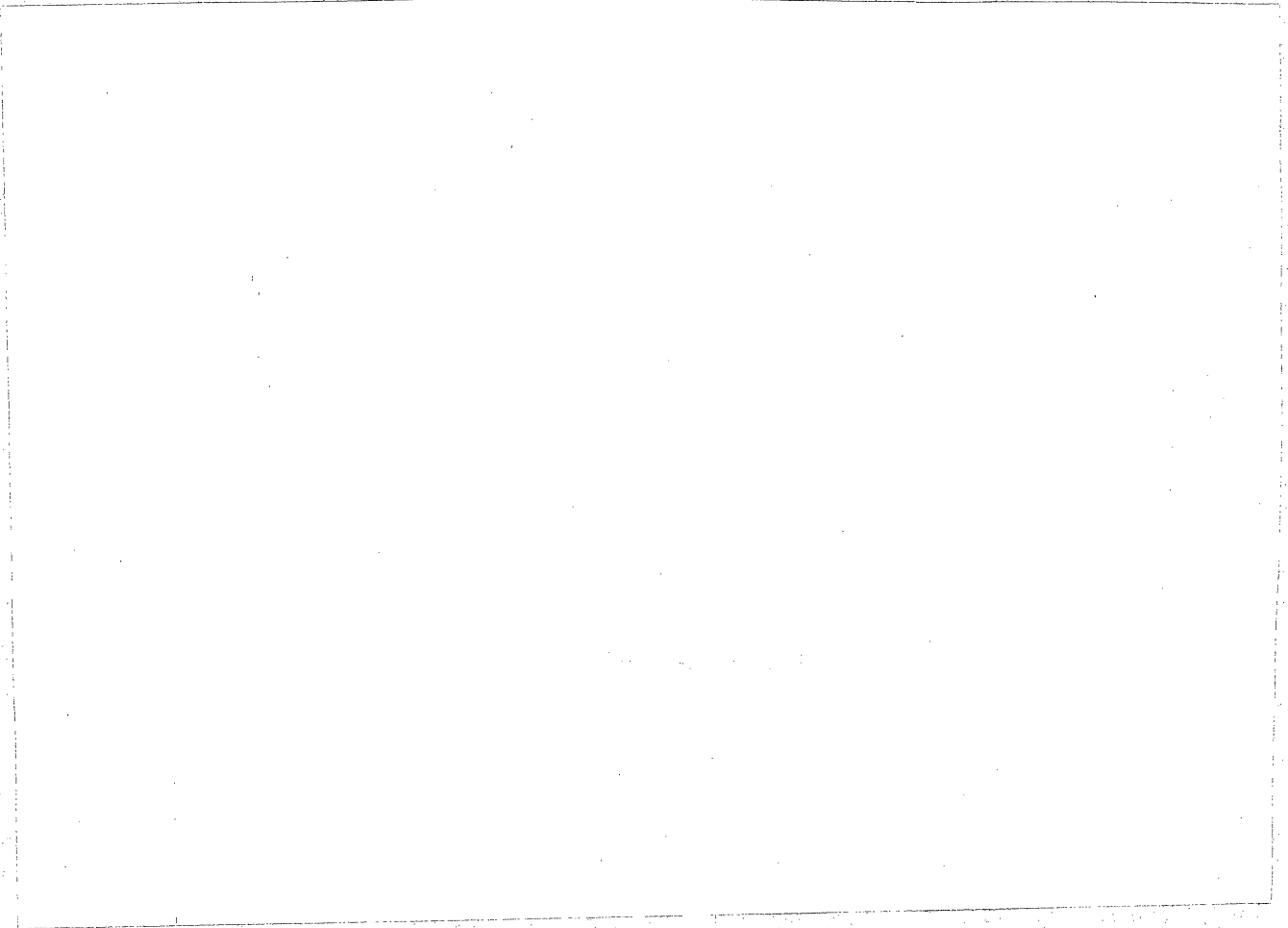
APPENDIX C:

CONSENT FORM

I, _____, agree to review the on-line tutorial "Creating a Technology Use Plan". I understand that reviewing this tutorial is entirely voluntary; I can choose not to participate at any time, and have the results of my participation returned to me or destroyed.

The following have been explained to me:

1. The purpose of this on-line tutorial is to provide a guide for site technology planners to develop an effective Technology Use Plan.

2. The procedure I will be involved in includes answering survey questions.

3. This participation will not in any way affect how I am evaluated, and will involve no risks of any kind.

4. The results of this participation will remain confidential, and will not be released in any individually identifiable form without my prior consent, unless required by law.

5. The investigator will answer any further questions about the study either now or during the course of the investigation.

_____   _____

Signature   Date

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