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Transparent technology in the classroom

Henry Frank Richards

TRANSPARENT TECHNOLOGY IN THE CLASSROOM

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

by

Henry Frank Richards

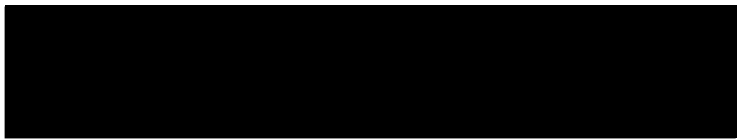September 2003

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Approved by:

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Eun-Ok Baek, Ph.D., First Reader   Date 8/20/03

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Amy S.C. Leh, Ph.D., Second Reader

ABSTRACT

This project addresses reaching non-technology teachers. New teachers taught as they were taught in high school and college. Their instructors taught using the methods that their teachers used. Veteran teachers grew up in a world of blackboards and overhead projectors. They may or may not reach out to technology.

School districts can in-service teachers weekly, but they cannot force teachers to adopt new technology. Schools can, however, provide tools to help teachers adopt technology at their own pace.

Technology is a fact of life. Children grow up with computers, the Internet, email, cell phones, and multimedia. Each can be a tool for the classroom, but the teacher needs a guide to help them adapt.

This project is a first step in providing a useful booklet for novice technology users. The booklet will also be added as a web page with a decision tree function to quickly move users to the appropriate section.

ACKNOWLEDGMENTS

graduating high school, my father gave me this advice. "Whatever you do with your life, son, be sure there's no math in it." Ninety percent of my fellow graduates from Victor Valley High did not finish college. I can only acknowledge the other advice my father gave me. "When you know what you want, don't quit, don't ever give up." Thanks Dad.

DEDICATION

I dedicate this work to my wife, Chris. It was through your inspiration and tolerance that I attempted this program. You motivated me complete my Bachelor's degree, to become a teacher. Then you were my example of what a great teacher should be. Finally, your encouragement to attempt the Master's program.

All that I am, all that I have, is because of you.

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CHAPTER ONE

INTRODUCTION

A century ago, a Midwestern family moved their family
by covered wagon from Montana to Wyoming. The technology
of transportation was mature, and soon to be replaced by
automobiles. However, the wagons were safely manufactured
for long-term operation. The horse-drawn wagon was
comfortable, compared to riding a horse, and simple to
prepare for use. The user didn't think about the movement
of the yoke, the levers in the brake system, or the
portable water available for horses and humans. They found
their way with landmarks and maps drawn by surveyors or
explorers. The technology of transportation was
transparent to the families of the nineteenth and early
twentieth century.

The first automobiles, in contrast, were unreliable,
uncomfortable, and open to bad weather. New users had to
learn new methods to work this new technology. Many
continued to use horse-drawn transportation. Some would
ride in, but not drive, an automobile. They refused to
bring this new technology into their daily lives.

School children of a century ago wrote on small slate
blackboards, or wrote with fountain pens, the latest in

writing technology for students. The technology was transparent to the teacher and her students.

Today, a century later, we drive computer controlled electronic marvels of transportation. The result is the same. The driver and passengers arrive at their destination in relative comfort and safety in their computer controlled automobile, while listening to satellite radio. They can map their destination on the dash with voice directions, using a Global Positioning Satellite.

Purpose of the Project

Educational technology has changed dramatically, but it is not transparent. Computers, DVD players, LC Projectors, presentation software, personal data assistants, and computer graphics have created a cornucopia of technological possibilities. Many new technologies are transparent to the student, but not for instructors. They use the same tools their own teachers used in college and grade school.

Schools are diverting resources for technology. "In the past ten years, American schools have spent more than $5 billion on new technology that was designed to improve student performance" (Norris, 2002). Unfortunately, the

new technology lay idle or underutilized by instructors. District Superintendents and parents direct principals to improve standardized test scores under threat of replacement. Principals, in turn, are placing similar pressure on department heads and teachers to improve their own scores by whatever means possible.

> In Texas, principals, superintendents, and even school boards can pay a heavy price--in some cases, losing their positions--if they do not forge a strong link between what is taught in classrooms and what is tested by the Texas Assessment of Academic Skills (TAAS), a state standardized exam. (Bushweller, 2002)

Classroom instructors face their own dilemma, use after school hours focusing on test scores, or learn to improve their classroom instruction through technology. Survival instincts push teachers to focus directly on test scores and not on creating a diversified learning environment.

The purpose of this writing is to demonstrate that improving test scores and instructional technology are not only compatible, but also essential for improving students' education. Novice users need help to solve technology problems. If they must continually call for help, and that help is slow in coming, they are unlikely to adopt any technology into their lesson plans. If they can solve simple problems quickly, they may be encouraged

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to use the technology again. In time, instructors will attempt technology that is more complex and eventually become competent users of technology. They may become revitalized teachers. The by-product of that invigorated teaching is the improvement of standardized test scores, student and teacher attendance, and reduced behavior problems.

Context of the Problem

Why do students need technology to improve their education? Gordon E. Moore, co-founder of Intel and author of Moore's law, originally stated computer chip technology would double every year. Improvement slowed to eighteen month in 1975 and remained constant through the end of the century [see Appendix A] (Moore, 1965).

Today's instructors must deal with the effects of the rapid change in technologies. Even if schools ignore everything since the invention of the computer, the students in our schools have not. They are multitasking at home. Watching multiple television channels while surfing the Internet, "burning" music CD-ROM's, chatting on their cell phone, while electronically participating in multiple conversations online.

That same student enters school each morning, placed in a seat, one of thirty-five, all in straight rows. The teacher lectures while students take notes on ruled paper. The teacher writes notes on a chalk or white board. Students read from their six-year-old text, looking at photos of historical sites or static prints of equations. The students watched the occasional instructional VHS video shown on a portable twenty-seven inch television. Images are barely visible past the third row and the audio is garbled and unclear.

Author Rudolf Flesch asked in his 1955 book "Why can't Johnny read." We still instruct Johnny using the same methods and technologies we employed in 1955. Johnny, however, has changed. Educators developed strategies to teach Johnny, but now Johnny is an immigrant, or has never read outside school, and finds nothing from school in common with Hip-Hop music, skateboarding, "X-treme" sports, and a hundred-fifty channels of digital satellite television. Johnny's school life consists of desks still in rows, monochromatic lessons, packed into neat fifty-minute units of time. Johnny has limped through Phonics, Whole Language, more Phonics, standardized testing, high-stakes testing, and back-to-basics.

The purpose of this thesis is to develop ideas or methods to assist teachers to find alternative tools to reach modern students. New teachers may be better able to reach today's students because they are only a few short years distant from them. They are tangential to today's students. The twenty-five year old men teachers wear a "buzz cut" and chinos. They too listen to Hip-Hop and know why Boy-Bands are for kids and Eminem is on the cutting edge.

These new teachers come from the same schools of education, taught by many of the last generations professors, who themselves are distant from the cutting edge of instructional technology.

The problem is to address these new teachers, whether young or mature and introduce them to other methods on instruction that could simplify the process of teaching and improve their opportunities of reaching this, and future generations of "Johnny". We should also introduce these technologies to experienced teachers and hope they too will introduce new technologies into their teaching strategies. However, some teachers may never adopt technology into their instructional strategies. This is a difficult concept to embrace. We must accept the fact that we will fail to bring some teachers under the

technological tent created in the twenty-first century.
Tenure prevents any real opportunity to force veteran
instructors. We can only encourage and hope they will
accept some measure of technology into their classrooms.

Computers are a fact. We teach within that context.
The business world demands workers that are computer
literate, students and parents use them at home, and many
schools have adequate facilities. A computer, linked to
the Internet, can help a teacher to organize and teach
their class online. Instructors can use a web site as a
central location where students and parents may find
information regarding the class, instructions for
completing assignments, review techniques that are not
available in class, and access to grades so students and
parents may have instant access to their grades.

Teachers wishing to model information to students can
do so with the help of an overhead projector. However,
their desktop computer, with an LC Projector can use
programs like PowerPoint, Inspiration, or MathCAD, to
instruct the class, utilizing full color, animations, and
multiple sources, without trying to move slides, books,
and other media to the top of an ordinary overhead
projector. Teacher can locate useful instructional sites

for math, English, social science, and science, on the web and share those with students.

Students can learn through video, but many videos are too long for class. Teacher must remove large portions to keep the content relevant to the classroom. The same material on a DVD player can switch location of the content in an instant, replaying segments quickly, and remove sections with as little effort as a click of the remote control.

A teacher or a small group of students may demonstrate their authentic knowledge of all subjects can use a simple Digital Video Camera. We can see the examples at http://www.apple.com/education/k12/curriculumsolutions to find a subject-related context for the video camera, in-depth research, and funding for technology.

The tools and technology exist in the students' world. They are part of their personal context of the world.

Significance of the Project

We require teachers to perform more duties, at a higher level. Their students, too, must perform on multiple standardized exams to complete a k-12 education. Teachers, students, and parents are losing control of the

education process. Criterion Referenced Tests, or CRT's, are removing teacher driven creativity from the classroom. Teachers can prevail if they use technology to open lines of communication with administration, students, and parents. The following diagram shows the implementation of technology in a multimedia class. It includes an array of possible technologies a teacher can bring to their lesson plans. The inside portion lists old tools that were replaced.

The cornerstone of educational technology is the computer combined with the Internet. The computer is the tool that connects, in some way, to almost everything else. The Internet includes a teacher-provided web site, with online syllabus, lessons, quizzes, parent accessible grades, and an online textbook. The diagram above illustrates how technology assists this instructor to teach Digital Video Production, Broadcast Journalism, and Advanced Broadcasting at Granite Hills High School in Apple Valley, California. The author designed and built the site to service one hundred fifty students, and their parents. The school does have a website, but it is rarely updated and does not provide teachers or parents access to update their information. Student use the instructors web site daily to determine their assignment, read their

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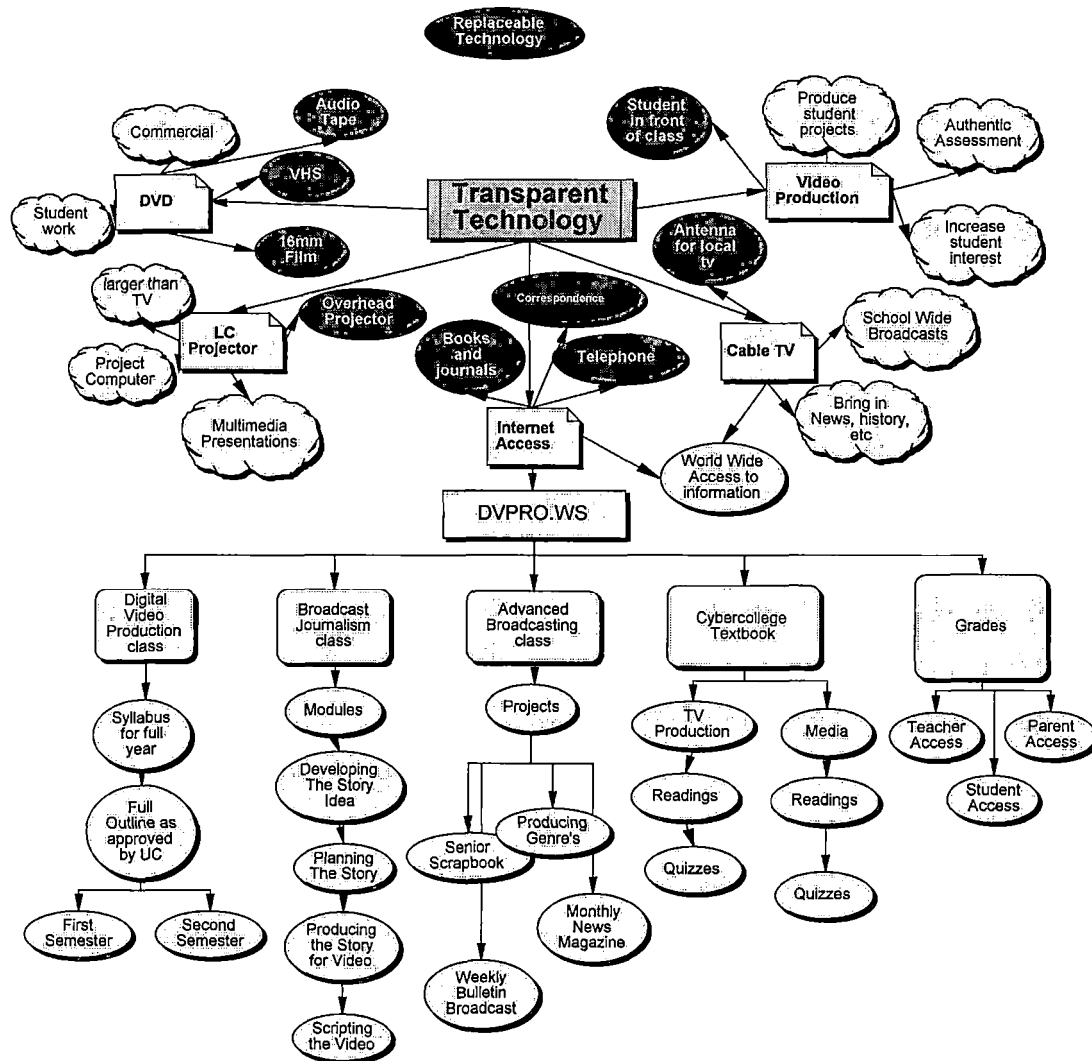
Figure 1. Transparent Technology

textbook, take quizzes, and check their grade from anywhere they have access to the Internet.

The students have little difficulty learning to use the site, though they are not accustomed to teachers providing full Internet access for any class. Their parents usually need some assistance from the student to

access grades. Parents have the option of providing an email address and the instructor can email parents at regular intervals. School administration ignores the site; instead pointing out that the school has a web site, even though that site consists of only one page.

The author uses the school web site one day per year to broadcast graduation over the Internet. Other teachers have no access to the official school web site, though a few do have their own site.

Goal of the Project

The goal of this Masters project is to develop a tool for high school teachers who are inexperienced using modern instructional technologies. The tool or tools must bridge the gap that prevents these teachers from attempting new technologies without having a technician at their side each day. The teachers should eventually become self-learners, to a limited extent, and feel more confident when calling for help.

This tool will assist teachers to reach these goals:

- Students will use a variety of technologies to demonstrate their skills.
- Teachers will have the skills to assist students learning with a variety of technologies.

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- All students should be able to receive similar tools from any teacher at the same school.

- Teachers will attempt to learn new skills when it is simpler to learn and does not adversely affect their self-esteem.

- Teachers will feel confident to ask for help if they acquire the requisite basic skills and do not need to attend after school instructional meetings.

- Motivate teachers and administrators to attempt new technologies on their own.

Project Overview

The concept of the technology assistance tool, developed for this Masters project, came from informal interviews with teachers both experienced and inexperience with the technologies available at our school. The look and feel of the device is important. If the tool is a full sized three-ring binder, most teachers will file it in a drawer and not use it. A web site or CD-ROM may be too complex for some. The tool must be a size and medium that will fit on a crowded desk and be easy to use and simple locate the information required.

Initially, I developed the tool as a decision tree on a web page. The inherent problem became clear with teachers that did not have Internet skills. They needed another tool to get into the web page. I had a difficult time accepting that technology would not be the only cure, but the tool had to meet the needs of the user, not the developer.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

Instructional technology is developmental. If we search backwards, we might stop at the Renaissance where we could regard Guttenberg, and his moveable type, as the beginning of instructional technology. Extrapolate to the twentieth century and we may add slide projectors, motion pictures, television, and the VCR (Jonassen, Peck, & Wilson, 1999). A study of the field might lead one to believe that searching for technological applications for education rivals only by the search for the Holy Grail.

Purpose of the Review

The purpose of this writing is to examine methods to utilize technology in schools for teachers and students in such a way that teachers feel comfortable bringing technologies into their classroom. We generally do not need to force technology on students. To them it is not technology; it's just what is. Like the telephone or television, it's part of our culture. Students have grown up with computers, camcorders, DVD players, and Dolby Surround Sound, et al.

The difficult strategy is to find how to help the instructor feel at ease with technologies invented after the teacher reached adulthood. Whatever technology an instructor chooses is not relevant to the instructional principals (Office of Research, 1993). If a computer is installed in a classroom, it can be an electronic worksheet, or a grade book. This is no improvement over old technology. If the teacher, however, uses the computer to demonstrate dissections in a science class, edit video from a student project, or become a digital home for a lesson, quizzes, and grades, then the computer is an improvement over old technology. But the technology must fit within the instructional strategies designed in the teachers' lesson plans.

Preparing Teachers

We will first address the indoctrination of new teachers. The influx from colleges and universities will have long-term effect on instructional technology. The benefit will last generations.

"Teachers teach as they've been taught" (U.S. Congress, 1995). Regardless what age that was, from kindergarten through college, we are students that learn from our teachers. When young people enter the profession,

they are likely to adopt the styles of the best teachers. The use or lack of technology will influence new teachers concepts of the delivery of instruction. The educational system, therefore, should model the use of technology at the college and secondary levels, at the very least.

Reaching current teachers is more difficult. They are already on the job and may have a course of education required to maintain their teaching credential. Extra classes for technology may be put off until later in their careers. Once a teacher is tenured, which happens after two years in California for k-12 teachers, the incentive to add skills becomes an intrinsic value, rather than a required skill. School districts are limited in means of assuring their teachers are proficient with, and will use, technology purchased by the district.

What should a district purchase for their schools? Technology must be updated and replaced. Should they purchase a computer for each classroom or laser disk players with bar-code readers? The answer is yes to both, but only to teachers that have first requested the equipment, and second, have received training or demonstrated ability to use the equipment (U.S. Congress, 1995).

In some schools, technology has become a department. Teachers in a "technology" department would have computers, printers, and other advanced technology for instruction. This limits the use of advanced technology to students that are enrolled in those classes.

Silicon Valley School District spent $27 million to place an average of six computers in each classroom. District officials question if the money was well spent. They point to only a modest increase in standardized test scores since the addition of computers. "There is no body of research that demonstrates that this investment in technology is going to pay off big time in terms of increasing student achievement," says Gary Bloom of the University of California, Santa Cruz (Morris, 2002).

This is the initial question districts ask when purchasing technology. Will it increase our test scores? While the answer may be yes, it is not necessarily the relevant question.

Use of Technology

It is relevant to ask if technology will improve learning. Both Piaget and Vygotsky believed that children learn when they are at play (Mooney, 2000). That is, if a child is engaged, or having fun, they are more likely to

construct a meaning to the activity and remember the activity and its relevance to other concepts. Think back to a high school class in Calculus, or Chemistry. Attempt to calculate a derivative or recount the periodic table. Give up? Now recall a sport you played in a youth league, or high school. Can you recite the rules? Likely you could because you were either having fun or the activity was meaningful to you.

Children already know technology. It may involve activities on a computer, or a DVD/Mp3 player. This prior knowledge can change the role of the teacher to a facilitator in class. Using Vygotsky's Zone of Proximal Development the teacher can assist the student through scaffolding what they know about a subject to a new level of understanding (Mooney, 2000). The technology in the classroom becomes a vehicle for the scaffolding.

Vygotsky specifically warns against the drill and kill use of computers. His conclusions were

> Repetition and reiteration must be avoided as it is the kiss of death for the student's interest. Instead the subject should be presented, initially, in its briefest and simplest form, covering the most important facts and relations. Later, the teacher can return to the subject in a deepened and extended form with new facts, conclusions and generalizations. Then interest will be aroused by itself. (Oscarsson, 2001)

If a child is allowed free time on a computer with a variety of programs the child may find a program of interest. This is, a music program such as ACID, or animation programs like Poser are simple to learn and use. Piaget wrote, agreeing with Dewey, that children learn only when their curiosity is not fully satisfied (Mooney, 2000). Technology can serve this purpose. The software above can be introduced, but the learning can be constructed by the student, when they are provided time for experimentation. Here the teacher becomes the facilitator, not the "sage on the stage."

This change in the role of the instructor is a substantial change for teachers accustomed to students sitting in straight rows, taking notes, answering questions only after they've raised their hands and been called on by the teacher. That method may work better for the college bound student, or the student competent in the education "game."

The new generation, net kids that grew up using digital devices don't see the technology. The widely-used quote from Alan Kay that technology is "...only for people who are born before it was invented" (Tapscott, 1998). Children don't wonder at a bank ATM or desktop computers. Their teachers, unfortunately, see these as inventions to

be learned or ignored. The proliferation of ATM's has made everyone aware of their use and most have mastered their complexity. Only a decade ago, though, some new users asked other users how to get cash from their ATM.

Small computers first came home with computer games like Pong in 1974 and Pac-Man in 1980 (Trueman). This enabled people from differing generations to become comfortable with the first computers.

Steve Wozniak and Steve Jobs sold the first home/school computer, the Apple II, in 1977 (Weyhrich, 2001). This product enabled schools to add a new technology for students, and to a lesser extent, teachers. The "drill and kill" software did bring computers into labs for students to use, but the experience only served as a replacement for work sheets. Students solved problems to be able to play short games. The software connected what they wanted to do with what they needed to do. It was a start. Schools committed to purchasing technology.

The technology tended to be computers and those computers were largely from Apple. In a Los Angeles Times interview in 1989, Sand Diego schools district vocational education director Susan Reese stated that "about 80% of all classroom computers in the district are manufactured by Apple, in large part because of the 'brilliant

marketing move' by the company in 1983 and the fact that most software was originally written for Apple and not for IBM and other brands" (Smollar, 1989).

Just as computers with their DOS operating systems, became a school standard, the Internet entered the educational equation.

Before 1993, a user would enter a Uniform Resource Locator (URL) to access an Internet location. This long string of names had to be exact or the intended location could not be located. The usage was limited to hard-core users in science and government. Marc Andreesen developed a browser in March of 1993 called Mosaic. This now forgotten logo is shown in figure 2. This browser caused an explosion in Internet traffic. Service traffic increased, a whopping 341,634% in annual growth rate (Cringely, 1998).
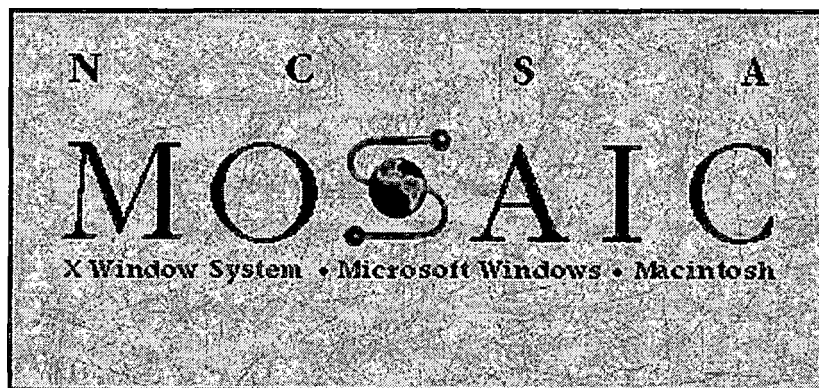
Figure 2. Mosaic Logo

Mosaic evolved into Netscape and communications was forever changed. An early adopter of the World Wide Web (www) was schools. Student and teachers could research in detail and speed unattainable at a school library. Teachers could communicate through email, newsgroups, and their own web pages.

The Internet began life as a communication product of the U. S. Department of Defense in the 1960's. American universities and colleges started using the Internet in the 1970's. It spread to Europe in 1973. The system evolved worldwide until 1986 when the U. S. National Science Foundation set up NSFNET linking five American university supercomputers. In 1990 the entire Internet was aligned under the control of NSFNET. Commercial use of the Internet was allowed in 1991 (Galbreath, 1997).

All the above was useful to dedicated users, but the graphical user interface (gui, pronounced "gooey"), i.e. Mosaic and Netscape, opened the Internet to widespread use. Prior to 1993, the Internet was used for electronic mail, news groups, file transfers (ftp) and minimal commercial use. After the GUI, the Internet became the World Wide Web. They are separate, but the Web browser is to the Internet as Microsoft Windows is to the personal computer (Galbreath, 1997).

After Mosaic and Netscape, the Internet could be used for access to information (free and paid), integrated email, video traffic, real-time corporate Intranets, commercial commerce, education, and training (Galbreath, 1997).

Table 1. Projected Number of Internet Users
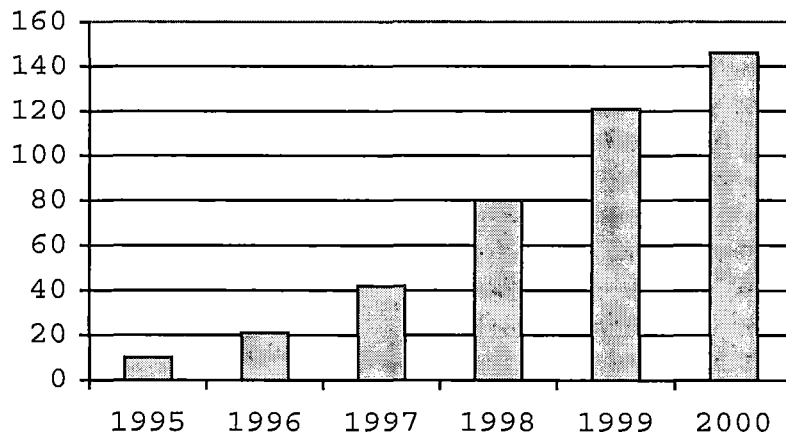
(Galbreath, 1997)

Table 1 illustrates the rapid growth of the Internet and Web after the advent of the graphical user interface. The ease of use allowed non-technical users to click and go on the Web.

The Internet and Web are not free. Research frequently tells a reader that the Web is free to users, but that is like saying television is free. Yes the signal is without cost, but one must have a television, and an

antenna, or cable or satellite. The television should be of a certain size, with a color picture. Soon the television must be digital. The signal is free, but watching television can cost hundreds or thousands of dollars. The Web is free, but the user needs a computer, a modem. A 28k modem is useable, but the user will have long waits. A DSL modem cable modem is necessary to receive the Web at speeds acceptable for the content sent. A business or school needs a T1 or T3 line. Using the Internet can cost hundreds, or thousands of dollars.

Development of Technology

The computer and the Internet are interdependent. The computer is the core technology that allows the Internet to exist, and the "killer app" that desktop computers need to be useful outside business, is the World Wide Web.

The two technologies have developed along a similar timeline. The Internet lags behind the development of computers because computers are the core technology.

Table 2 illustrates the simultaneous growth of the Internet and the related growth in use of computers.

Table 2. Simultaneous Growth of the Internet

COMPUTER	YEAR	INTERNET
Mainframe computers	Pre-1974	ARPNET. TCP
Intel releases the 8080 chip, the basis for the 1st IBM PC. Altair homemade computer.	1974	
IBM releases the IBM 5100 Portable Computer. Cost up to $19,000. Bill Gates and Paul Allen found Micro-Soft (hyphen dropped later)	1975	
Hewlett-Packard rejects computer made by Steve Wozniak. Steve Jobs and Steve Wozniak incorporate Apple Computer. IBM releases the IBM 5100 desktop. Cost about $10,000. Atari rejects Steve Jobs idea for a personal computer.	1976	Queen Elizabeth II of United Kingdom sends an email.
The "killer application" VisiCalc is released for Apple II. Sales of Apple II raise from $1 million to $8 million.	1979	
Apple has 50% of the PC market.	1980	
IBM releases the IBM PC. Cost $1,565.	1981	BITNET (Because It's Time Network)linked City of New York University and Yale University. Used for file exchange and email.
Introduction of the Commodore 64 computer. Will go on to sell 17 million units.	1982	Transmission Control Protocol/Internet Protocol (TCP/IP). Department of Defense requires standard protocols so Army and Navy can "talk" to each other. Found out they couldn't during the invasion of Granada.
Commodore 64 computer. Will go on to sell 17 million units.	1983	

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Table 2. Simultaneous Growth of the Internet (cont)

COMPUTER	YEAR	INTERNET
Apple releases the Macintosh.	1984	Introduction of Domain Name Server or DNS. This distributed database allows local administration of units of the Internet.
Microsoft introduces Windows 1.0	1985	
Introduction of WordPerfect 4.2 and Adobe Illustrator	1986	NSFNET backbone created with 56 kbps speed.
Apple produces their 1 millionth computer.	1987	Number of Internet hosts breaks 10,000.
Apple releases Macintosh Classic with a color monitor. Microsoft releases Windows 3.0	1990	ARPANET ceases to exist. Archie released for indexing Internet sites.
QuickTime for Macintosh. Sound Blaster sound board for PC.	1991	Gopher released to access the web. WWW (world wide web) based on hypertext, released by CERN.
	1992	Number of Internet hosts breaks 1 million. Term "surfing the Internet" coined by Jean Armour Polly.
200 MHz Intel chip for PC. Intel introduces the Pentium chip.	1993	Marc Andreessen develops Mosaic, a graphical interface for the web. It takes the Internet by storm.
	1994	Andreessen develops Netscape Navigator 1.0. U. S. Robotics sells the 28.8 Kb modem.
Compaq Computer surpasses IBM becoming number one in PC sales.	1995	Real Audio streaming allows users to hear in real-time on the Internet.
	1996	Netscape and Internet Explorer battle for dominance of the Internet.
Intel introduces the Pentium II chip	1997	

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Table 2. Simultaneous Growth of the Internet (cont)

COMPUTER	YEAR	INTERNET
Microsoft introduces Windows 98 with Plug-N-Play capability.	1998	Internet Explorer dominates the Internet.
Intel introduces the Pentium III.	1999	
Intel introduces the Pentium IV.	2000	Pentium IV enables streaming audio and video. 35 million Americans listen to music online. 45 million play games online. Number of people connected to the Internet passes 400 million. Digital Subscriber Line (DSL) and Cable modems bring high speed access to homes and small business.
Number of PC's sold worldwide 1981 to 2000 reaches 835 million units.	2001	

These two tools, the computer and the Internet, have a third member, email. This electronic communications tool uses both the computer and the Internet as a foundation. There are other methods to utilize email, but the most common form is on a computer, using the Internet. This tool enables a teacher to communicate with other teachers, parents, and even students. Used school wide, the tool can help teachers communicate with parents.

Do these tools belong in our school? Howard Gardner, the author of the seven intelligences wrote how technology can be used in schools.

> ...the new technologies hold tremendous promise, but they must be seen as a means rather than

ends. A pencil can be used to write Spencerian
sonnets or to poke out someone's eye. A computer
can deliver drill-and-kill curricula or
stimulating scientific puzzles, it can educate,
enlighten, entertain, and instruct, or it can
dull perceptions, stimulate consumerism, and
reinforce ethnic stereotypes. The Internet can
help create vigorous and constructive
communities, it can isolate and desensitize
individuals to their fellow human beings; it can
even forment hatred. (Gardner, 1999)

Summary

Technology can be a tool to transform education.

Schools will reform, but the progress of reform can be

enhanced by the integration of technology into the toolbox

of teachers (Chiero, 1999).

CHAPTER THREE

DESIGN AND DEVELOPMENT

Introduction

What technology is appropriate to the secondary
classroom, and how can the use of that technology become
transparent to the instructor and students? The answer is
essential for teachers that want to introduce technology
into their curriculum, but lack the background to do so.
The response of teachers about how best they can learn is
essential to the design of a tool they feel comfortable
using. Once the tool is developed, we worry that teachers
may use it once and file it away, never seen again. The
tool design is vital to bringing teachers from fear and
confusion to illumination.

Analysis

The elements of teaching adults are a century old,
and adults' fear of learning something new is as old as
mankind. We could equate the fear of technology to the
fear of mathematics or the fear of flying. Some will only
do it when they absolutely have to.

Selected teachers answered a few questions on a
general survey of their needs and problems. I chose a
simple process of selecting participants. I am a member of

the technology committee on campus and we regularly work with staff members on technology problems. The second criteria came from a note in teacher mailboxes asking for the assistance of novice to moderate users.

These two sources provided a group of fourteen potential interviews. Most were teachers, but a few were classified as secretaries. The secretaries were proficient with MS Word, but lacked adequate skills in other areas. The teachers all came from the same high school, but taught in a variety of subject areas. Before interviewing participants, approval was sought and received to use human subjects in research. All participants' names are represented in code. Table 3 represents the subject's interviews and a summary of their responses. They were divided into Math; Science; English; Social Science; Fine Arts; Foreign Language; Elective; and secretary.

The complete survey is in Appendix (). The results of the interviews did not clarify the problem. The expected result was that a majority of interviewees would prefer one type of assistance tool. The actual result was no majority preferred any particular any particular tool.

Table 3. Represents the Subject's Interviews

	Partici pant ID	Teaching Area	Assessed skill level	Weakness W=Word P=PwrPt E=excel G=Gradebook I=Internet C=Camcorder	Preferre d method to learn I=Intern et C=CD B=Bookle t	(A)c cept (R)e ject
1	J1	Elective	Average	E; G; C	I	A
2	M1	English	Average	P; E; I; C	C	A
3	L1	English	Novice	W;P;E;G;I;C	B	A
4	D1	Math	Novice	P;E;I;C	B	A
5	P1	Secretary	Average	P;C	I	A
6	M2	Elective	Novice	E;I;C	I	A
7	C1	Science	Average	W;P;E;C	C	A
8	J1	Social Science	Novice	W;E;P;G;I;C	B	A
9	R1	Social Science	Expert	C	I	R
10	B1	Social Science	Novice	W;E;I;P;C	B OR C	A
11	P2	Math	Average	E;P	C	R
12	D2	Math	Average	C	I	R
13	P2	Fine Arts	Novice	P;I;G	C	A
14	C2	Foreign Language	Novice	W;P;I;C;E	B	A
15	T1	Secretary	Average	C	I	R

This unexpected result left the author in a quandary. If the resultant tool only meets the needs of a few users and is not useful to others, then the project fails. If there is no one method that will help a majority of users, what course of action remains?

The interviews did point to three possible tools; an easy to use, pocket-sized handbook, a CD-ROM with hyperlinks, and a web-based resource.

Elements of Prospective Tools

"Oh, another thing I gotta' teach." Said one teacher when confronted with computers, software, and other new equipment. The outburst met with applause from many of the other teachers. We cannot overcome resistance with in-services, coercion, even rewards. A teacher that does not see how they can either 1) improve their current teaching, or 2) reduce the amount of time and effort involved in teaching, will not find adequate motive to change their method of teaching. Any new technology needs to be as simple or efficient as the technology they will discard. Anyone that has taught in K-12 classrooms has seen the teacher described above.

Some technology has already reached the transparent level. Videotapes and televisions are examples. VHS video and desktop computers are from the same era, but they do not have the same level of transparency. Aspects of VHS are difficult, such as setting a timer. However, most will master the basic operations, playback and record.

The computer has levels of transparency. Casual users can write a basic document, or produce a simple spreadsheet. Many are capable of sending and receiving email or surfing the web. Teachers can assign students simple software for drill and practice, sometimes through

the help of a computer aide. The one thread connecting all users is that users will learn what is important or useful to them.

This simple use of technology does not allow access to the array of tools used in business and industry. In order for a teacher to maximize available technology, the instructor must find a link from what they know to what they need or want. In figure 3 we compare old and new technology and from that point, or how to create a transparent environment.

The goal is to transfer the transparency of older technology, as seen on the left above, to the newer technologies seen on the right.

What is transparency? Teachers routinely flip on an overhead projector, show a VHS movie on a television, write a note, or call home to parents, assign reading from a text, and have students write their thoughts and store them in a journal. Any new teacher could duplicate these without help from a mentor. The teacher feels comfortable using some technology; they do not have to "bone up" to use it. They probably do not even think about it as technology. That is their transparent technology.

OLD Technology is replaced by what NEW Technology

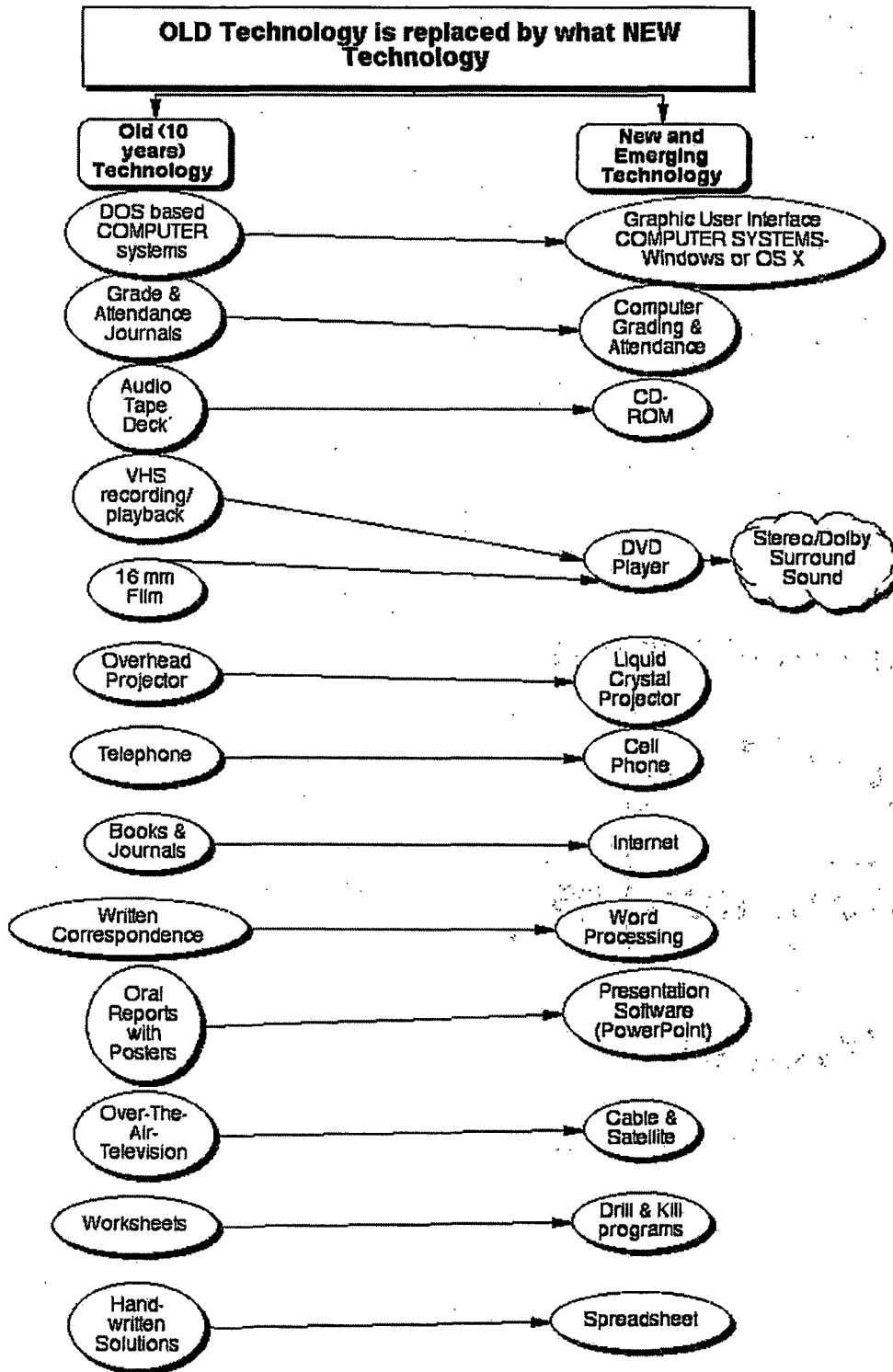| Old (10 years) Technology	New and Emerging Technology
DOS based COMPUTER systems	Graphic User Interface COMPUTER SYSTEMS- Windows or OS X
Grade & Attendance Journals	Computer Grading & Attendance
Audio Tape Deck	CD-ROM
VHS recording/ playback	DVD Player → Stereo/Dolby Surround Sound
16 mm Film	
Overhead Projector	Liquid Crystal Projector
Telephone	Cell Phone
Books & Journals	Internet
Written Correspondence	Word Processing
Oral Reports with Posters	Presentation Software (PowerPoint)
Over-The-Air-Television	Cable & Satellite
Worksheets	Drill & Kill programs
Hand-written Solutions	Spreadsheet

Figure 3. Old Technology is Replaced by What New Technology

Some teachers will eagerly invest their time and effort in new forms of technology. When they see how others, using computers, can calculate grades in minutes not hours, they will accept a computer. Some may only use it for grades and a game of Solitaire, but they are using a computer. Next is using available software. Most computers come with a basic text writer, and many with an office suite. Reluctant teachers will see the benefit if writing once and editing many times on a computer, a much simpler procedure that hand-written notes and letters.

Teachers that lecture with an overhead projector may find that it is not too difficult to become proficient with PowerPoint. Once they can write lecture notes and their overheads once with presentation software and see it presented to the class with on Liquid Crystal Projector, they may be astonished at the ease of use and the interest of students. Our hypothetical teacher has become an emergent user.

We do not want to overwhelm our teacher, so we will not attempt to add another layer of technology too soon. Perhaps they could be enticed next semester, or next year. They may even ask for more.

Chapter One had an illustration of how technology aided the instruction of video production. Technology and

video production seem to go hand-in-hand. Would this apply to mathematics? If it cannot, then technology only has limited utility in education.

Let us assume a typical high school math class with one computer for the teacher and one computer for the students. The school uses a Novell network, and is connected with a T-1 line for the Internet. Each classroom has a twenty-nine inch television, access to the local cable company. Computer software includes Microsoft Office – Professional, MathCAD, and a grading program. The math department bought one LC Projector for every five teachers. Each classroom at the school has a telephone. Every math class has a set of Texas Instruments graphing calculators. The above items came from the Digital High School Grant.

The school developed a modest web site that teachers may access to post items from their class. "Stand And Deliver" is the only high school level movie ever made about mathematics, and most students have seen it before ninth grade. The department does have one DVD player, just in case.

Our hypothetical teacher is not techno phobic, but has been slow to utilize available technology. Every other Monday the instructor prepares the class a new chapter.

The course syllabus is on his/her webpage and shown to the class with the LC Projector, from the desktop workstation. The students (and their parents from any computer) can see what they have accomplished and what chapters lie ahead. He/she introduces the chapter with a brief PowerPoint presentation using the computer and LC Projector, outlining the objectives of the chapter and how the current chapter relates to previous knowledge. The instructor saves the presentation in HTML and uploads it to his/her section of the school web site.

Tuesday, the instructor models the basic steps to solving the new problems, demonstrating several examples for the students. Those examples are part of his/her lesson plan and uploaded to the webpage after school. All students with computer access can review the examples anytime outside class. The instructor, or an aid, posts homework assignments on the webpage each day and solutions to selected problems are also posted, with relevant explanations.

A ten-question quiz awaits student on Friday and the results posted to the grading program, and current grades publish, using student identification numbers only, on the web page. In a classroom with sufficient computers the quiz is administered at QuizLab (www.quizlab.com). Parents

received a letter home in September with their students name and a unique password for access. Parents can also email the teacher anytime and some have requested regular emails home with their students' grade and previous assignments. The grading program allows the teacher to do this anytime.

On the second Monday, the class begins to investigate deeper meanings to the chapter. The instructor uses MathCAD to illustrate complex steps to the equation to the class using the computer and the LC Projector. The program also illustrates a three dimensional graph of the equations. The students replicate the computation on their hand-held graphing calculators.

Later, before going to lunch, the teacher sets his classroom telephone to forward calls to his cell phone. A parent calls during lunch because that is the only time available to call the teacher. He takes a few minutes to discuss problems about their child's homework.

Tuesday, a group of four advanced students approached the instructor with a small video project. They used the departments' digital video camera to tape a seven-minute story on practical uses of the chapters' objectives. They completed taping in the school's quad on Tuesday, edited

on Thursday, and showed their work to the class after the test on Friday.

Wednesday the class watches a few minutes from a DVD program produced by the Standard Deviants on Economics. The economic principals use the mathematics discussed during the previous few days. The instructor showed the same video the year before but discovered minimal student interest when viewed on a television. This year he used the LC Projector and two external speakers. He noticed that all students appeared to watch and listen without distraction. He used part of a white wall, increasing the size of the viewing area to a six-foot by five-foot area.

The chapter test came Thursday. Friday to review the test results and grades uploaded to the web page by Friday afternoon.

CHAPTER FOUR

PROJECT DESIGN AND METHODOLOGY

The Project

A self-help guideline assists the transition to
transparent technology for the novice. Many instructors
will need personal assistance, but before calling the site
technology assistant, instructors should first attempt to
resolve problems with the use of a decision guide. The
decision tree model, as shown in figure 4, can give the
user quick reference to possible quick fixes and eliminate
waiting time to use the equipment. This self-help as will
empower the instructor will a sense of ability and
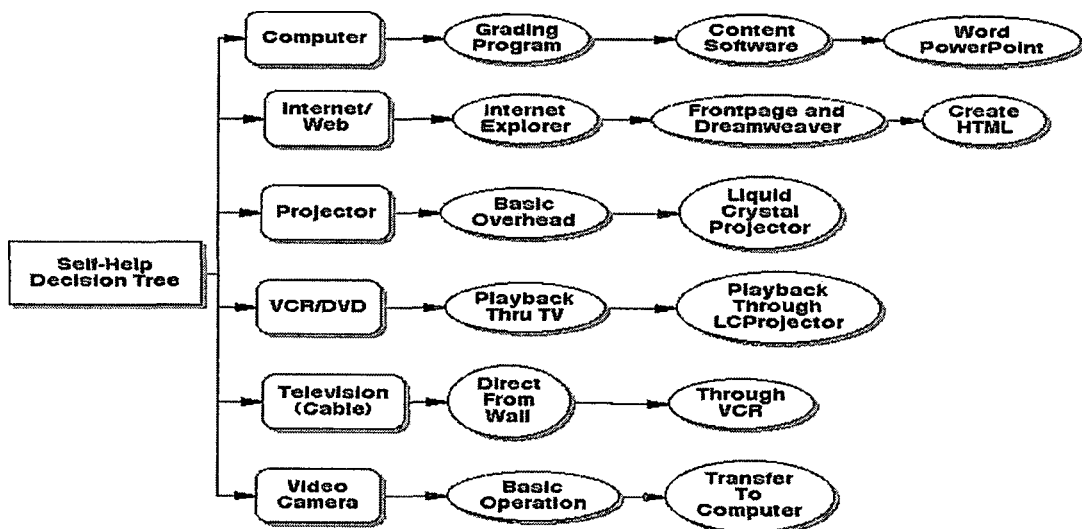decrease their anxiety of using newer technology.

Figure 4. Decision Tree Model

The primary area's of need are the computer;
Internet; projector; VCR/DVD; television; and video
camera. Through the decision tree help guide the
instructor may pinpoint the area of trouble.

The point of contention remains; how do we reach
timid instructors and provide a safe pathway into their
choice of technology?

Instructors split into three categories. The first
group had some web experience and preferred a web-based
tool. The second group had experience with CD-ROM's and
DVD's and preferred a CD-based tool. The third group
feared all technology and preferred an instructor to
handhold during the learning process, but felt they could
accept a flip chart or book as an instructional tool.

The data presents a problem. Apparently, the solution
is multiple solutions. While the solutions do not require
learner customization, solutions do need to fit learning
styles or needs. The solution should be prepared in three
parts.

The three parts are not ordered by value. First, a
multi-chapter handbook with sections separated by general
headings. The second and third tools, a CD-ROM and a web
site can be combined into one unit, but available in both
forms.

It is a personal belief that the book form is a temporary solution for most. Once learners gain a modest self-confidence, I believe they will switch to the CD-ROM and/or the web site as their primary learning device. I also believe that for most, their learning curve will resemble Moore's Law. That is, their learning will accelerate and the sum of the learners ability will continue to double until they reach their own level of necessary competence. These learners, filled with new confidence, will transfer their primary source of learning from Ethernet to the students in their class. Regardless of how we concentrate our continuing education, the digital generation will know what we need to know before prior generations. The difference, and why their elders remain the teacher, is the tool still needs wisdom and experience to be useful.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Introduction

I found in my research that learning technology is nearly a personal experience. That is, no two individuals I interviewed have the same or even similar technology background, and they each want/need a different learning experience. Some were experienced with the Internet or word processing, or some were more graphics oriented, while others did not truly want to use any new technology.

The high school where I teach has tried for four years to bring ninety percent of the teachers to a level of technological competence. So far, we have fallen far short of that goal.

The technology committee meets monthly and at each meeting we discuss possible solutions bring teachers up to speed with existing technology. We reach a consensus, put the plan into effect, and have the same rate of failure with each attempt.

Conclusions

Our most recent attempt to reach out to unwilling teachers is this document. We will try a multi-faceted approach. We began during this past school year to find

those methods that would reach the reluctant learner. I find it difficult to believe there are some who will never see the usefulness of the computer, the Internet, or other multimedia, to their classroom. I must accept that conclusion. My quest is to minimize that group and allow the hesitant learners to see the possibilities they have available to them.

Recommendations

If others decide to investigate this same subject I would suggest they study a small number of teachers as they work with new technology. Experienced users pride themselves in not reading the manual, and new learners find manuals confusing and incomplete. The study of how a few learners from different age groups might yield some insight into how to reach reluctant learners.

This same study might also be applied to teenage learners and how their background affects their learning curve. I wonder if hours of computer time playing games reduce the learning curve for other technologies.

Technology will continue, I believe, integrating more into our personal lives. I also believe that the paramount importance is the education of students, not the comfort of teachers. Districts should test new teachers for their

ability to integrate technology into their lessons. Tenured teachers should have a technology component inserted into their annual review. When learning becomes important to a student, including teachers, they are ready and willing to learn.

APPENDIX A

SELF HELP DECISION TREE FOR TECHNOLOGY PROBLEMS

Computer

We have Windows98 based Tangent, Dell, and Gateway on campus. We also have OS 9 and OS X Macintosh computers. Most instructions are general to all types. Where noted, they are specific to Macintosh only.

Computer won't turn on:

Check the power cord in the back of the computer and the wall. Wiggle the cord at the back of the computer and push in.

Check the outlet. Plug another device into the same wall outlet and test the power.

Check for a "toggle" switch in the back of the computer. The toggle will have a 1 (one) or a 0 (zero). The "On" position is the number 1.

On Macintosh the "On" button can be on

The top row of the keyboard (G3)

The front of the computer (G4)

The side of the computer base (iMac)

Call for help.

Computer is on, but nothing on the monitor:

Check the power plug in the back of the monitor and the wall. Jiggle the cord at the back of the monitor and push in.

Check the wall outlet. Plug another device into the same wall outlet and test the power.

Follow the other cord from the back of the monitor to the back of the computer. Push in on the cable head and check that is it screwed in fully.

Check the power button on the front of the monitor. There should be an amber or green light on next to the button.

Call for help.

Grading – Grade Machine:

To see full instructions, open the manual for Grade Machine. These instructions are for the simple, basic instructions and troubleshooting.

Adding a student:

From the VIEW menu chose STUDENTS.

Type required information. You may sort later or use the EDIT menu and INSERT ROW to add a row within an existing list.

Deleting a Student:

This is permanent.

Click the students ROW NUMBER (not the name)

Select the EDIT menu and click CUT. All information will be eliminated for that student.

Sorting student names:

Select the UTILITIES menu and click Sort Students

Chose the NAME field and click OK.

Assignment:

If you are continuing, the same set up from the previous semester this will work for you. If not, you need to read through the manual, or call for help.

From the CLASS MENU select Categories

Select Next Quarter

Click Copy From Previous Grading Periods

Click Copy

Entering an Assignment.

From the VIEW menu select Assignment

Type the description and the number of possible points

Type in the weight of the assignment, if not equal to others

If you have separate categories, select the correct category

Select Enter to add more assignments

Entering Scores.

From the VIEW menu, select Scores

Locate the column containing the assignment you wish to score

Type the score and press Enter. The cursor will move down to the next student

Special Scores.

See the CLASS menu and Special Scores

In the Scores window enter the abbreviation for the score such as inc for incomplete, ab for absent, ex for excused, and dr for dropped.

To enter extra credit for a score use the + sign with the extra points. Ie, a possible score of 10 earns 5 extra points, enter +5 for a total of 15.

Printing a report.

Select the REPORT menu and chose an Individual or Group report
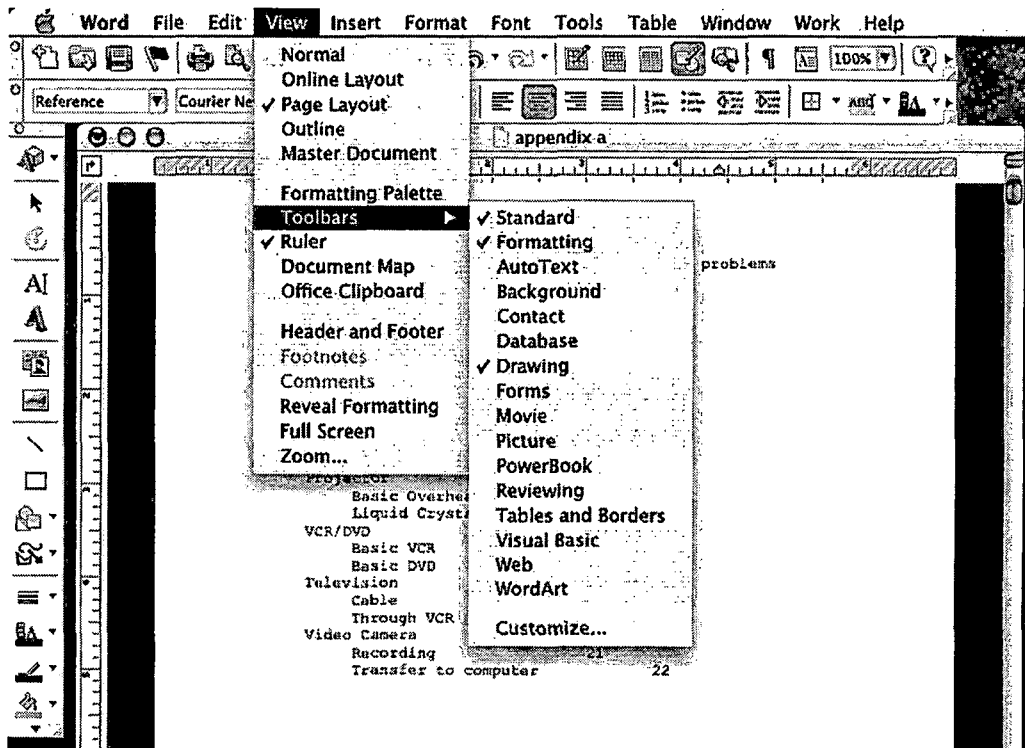
Click Print. You may wish to Preview the report before you print.

Microsoft Word:

To see full instructions, open the manual for Microsoft Word. These instructions are for the simple, basic instructions and troubleshooting.
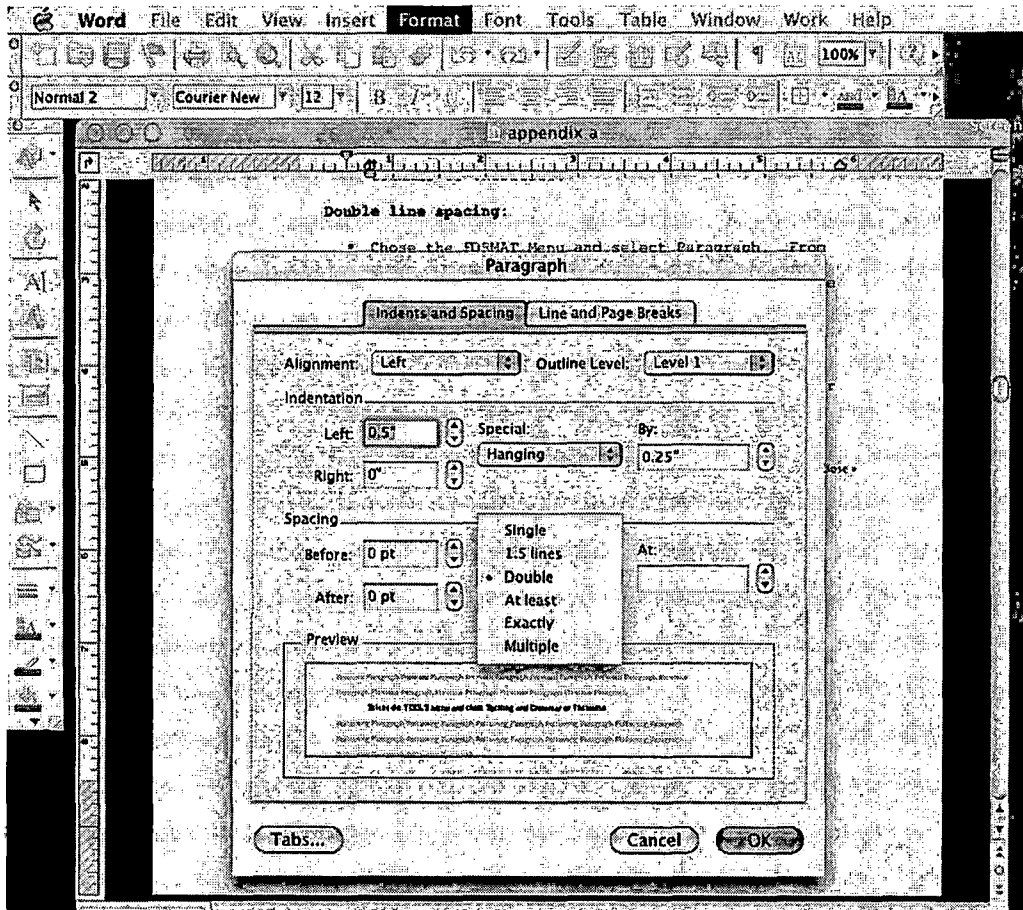
Toolbars:

- Select the VIEW menu and chose Toolbars.

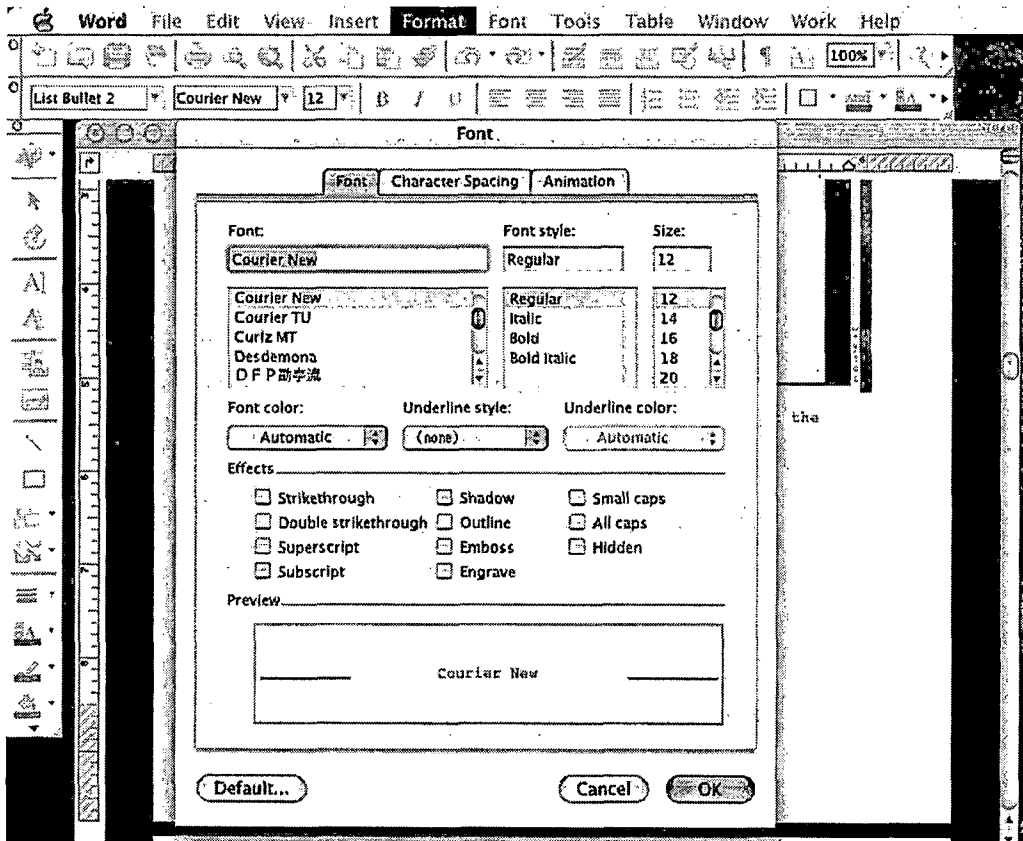 o The two most used are Standard and Formatting.

Font and text size:

In the Formatting Toolbar, the second tool from the left is the Font. Next to Font is Font size. Chose the desired front and size. OR

Select the FORMAT Menu and chose Font. Select the desired Font and Size.

Create a new document Open a document:

- Select the FILE menu and New Document. You may also select a template from here.

- From the FILE menu, select Open. Select the folder from the top of the dialogue box and select the file you want.

  o You may need to change the File Type at the bottom of the dialogue box to rtf or txt or an older version of Word.

Save a document:

- Select the FILE Menu and chose Save or Save As. In the Dialogue box, type the file name, the folder to save in, and the type of file, usually a Word Document. In Windows, this will cause an extension of dot doc (.doc).
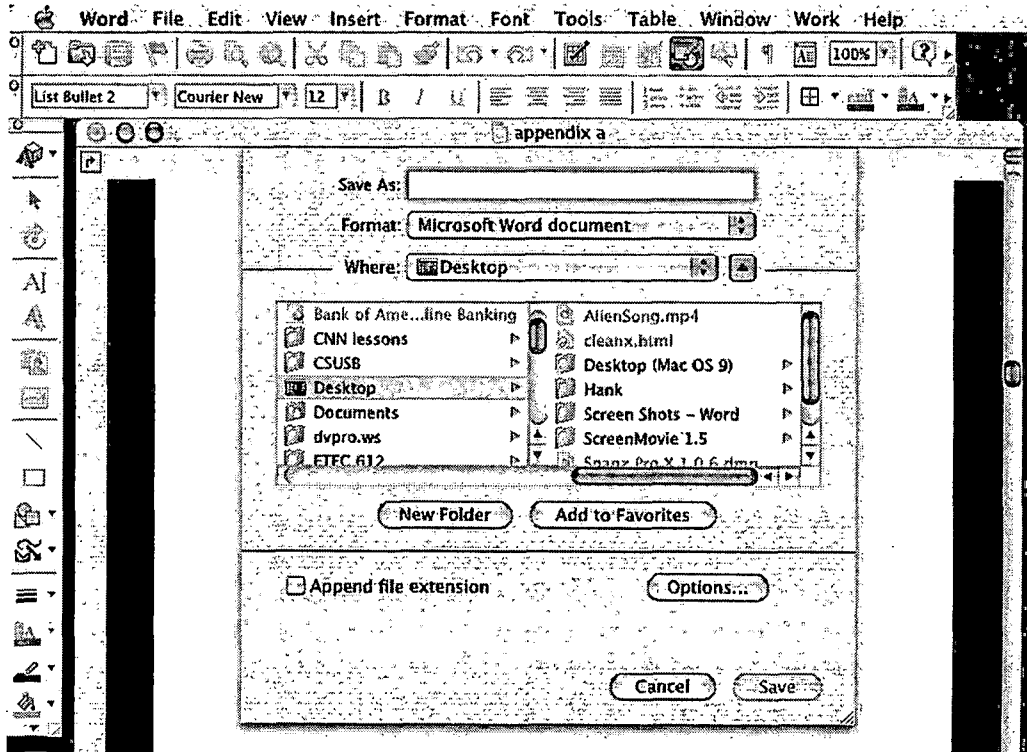
Print a document:

- Select the FILE Menu and chose Print. From the dialogue box select the printer and number of copies to print.
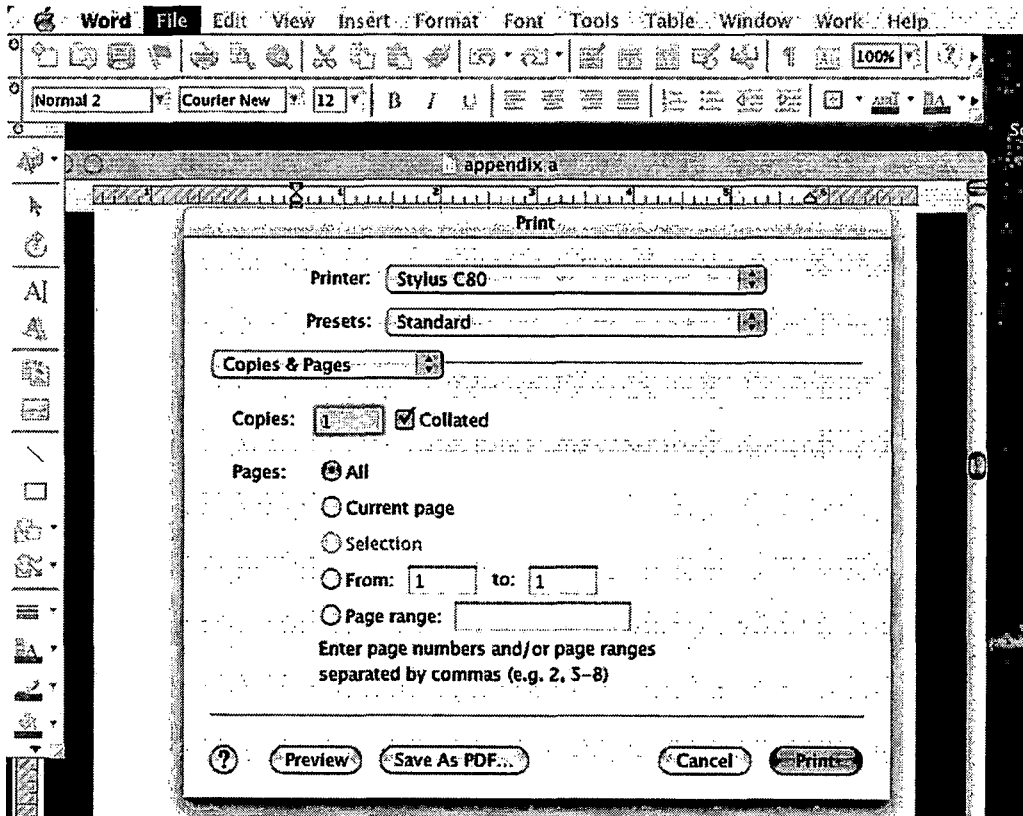
Spell and Thesaurus check:

- Select the TOOLS Menu and chose Spelling and Grammar or Thesaurus.
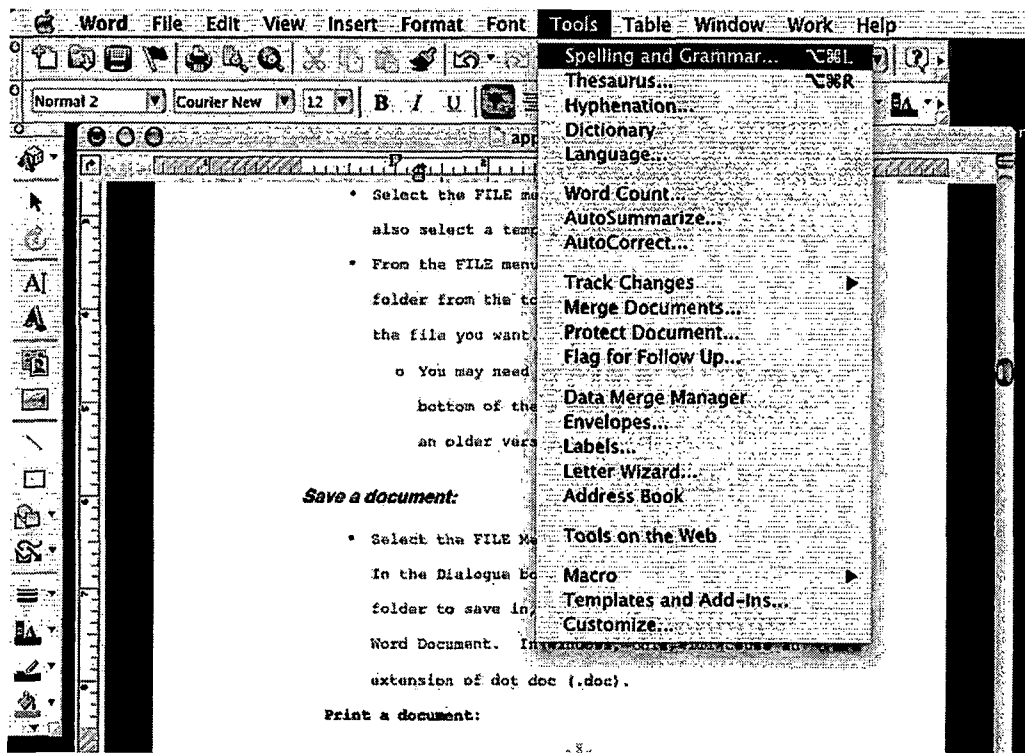
Double line spacing:

- Chose the FORMAT Menu and select Paragraph. From the dialogue box change under Line Spacing, Single to Double.
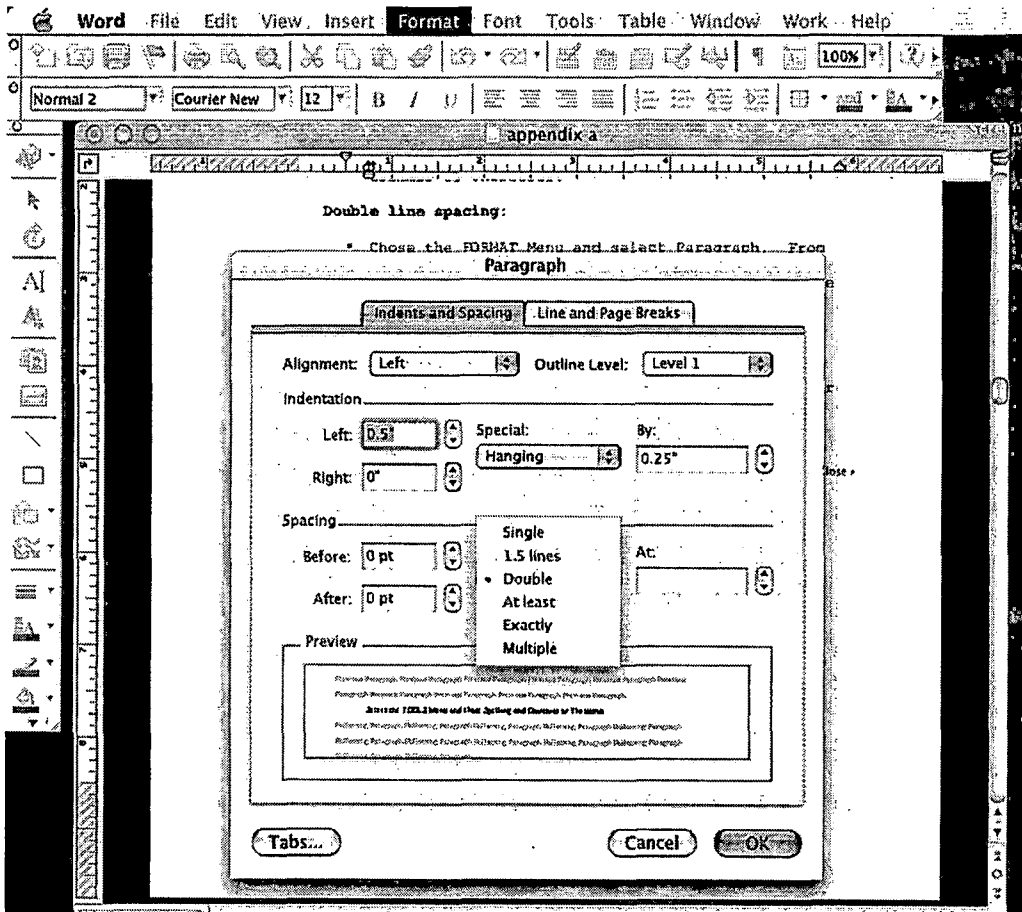
Header and Footer:

- Create a Header under the VIEW Menu. Chose Header and Footer.
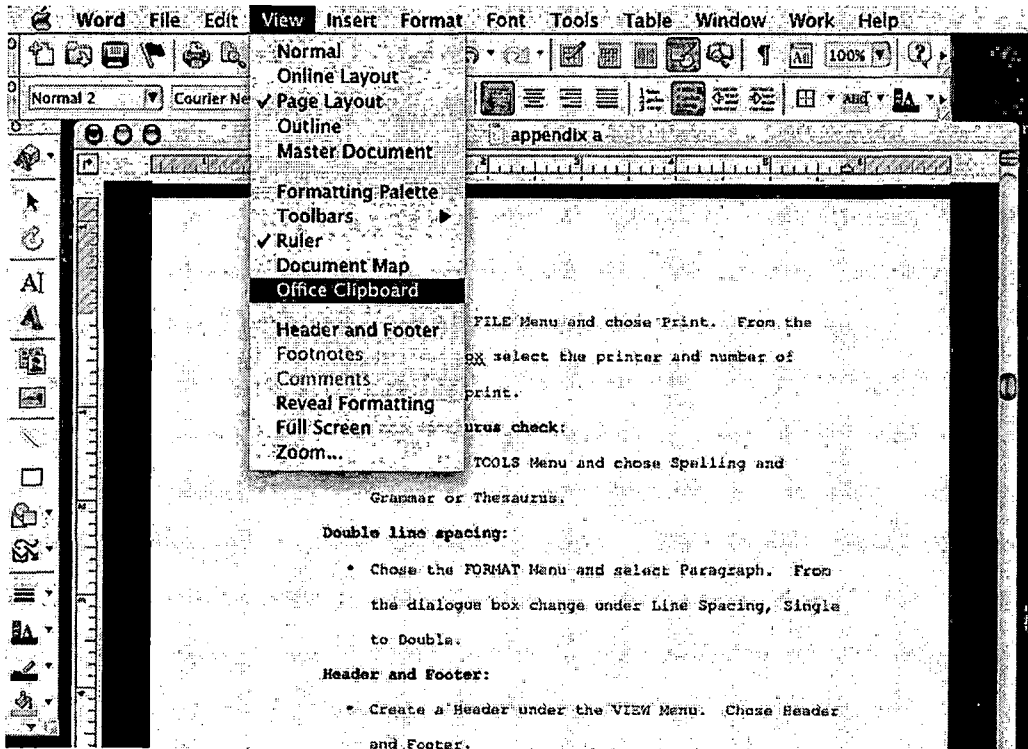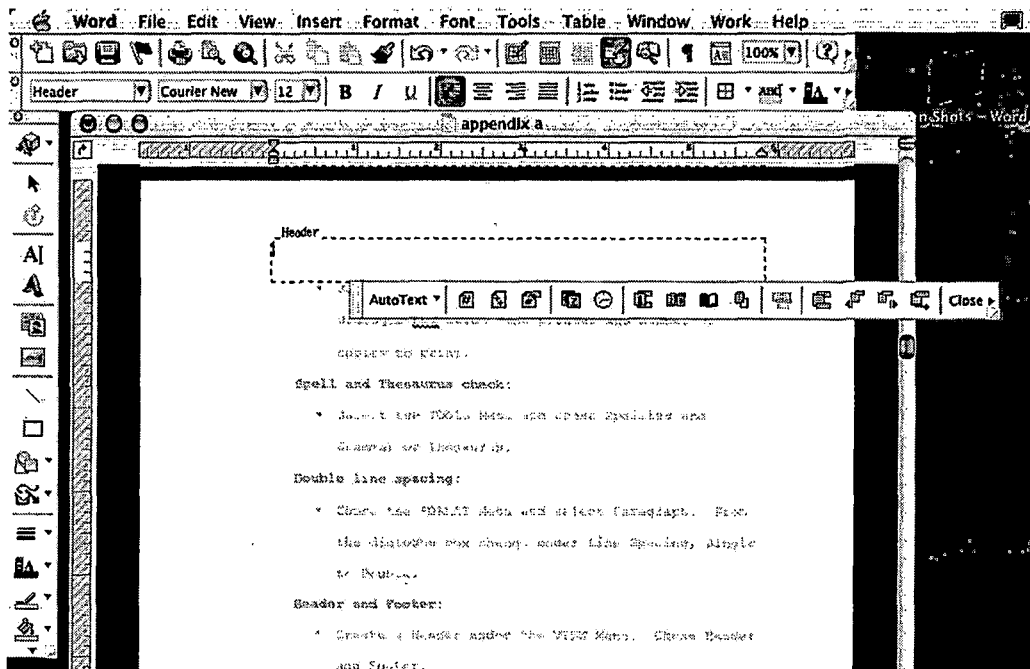
    o   Under 1, select the page number

    o   Under 2, change header to footer.

PowerPoint

To see full instructions, open the manual for Microsoft PowerPoint.
These instructions are for the simple, basic instructions and troubleshooting.

Create a new presentation.

Select the FILE Menu and click New Presentation

Select a Slide from the New Slide dialogue box
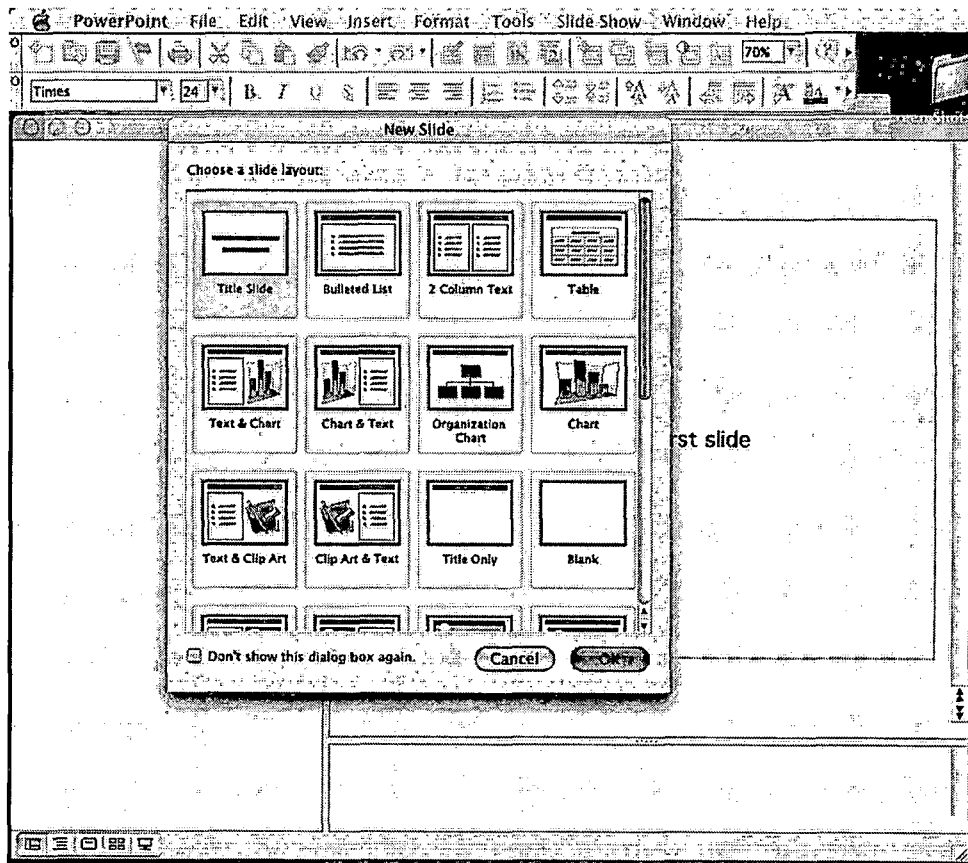
OR select the FILE Menu and Project Gallery

Click on Presentations and select from the templates
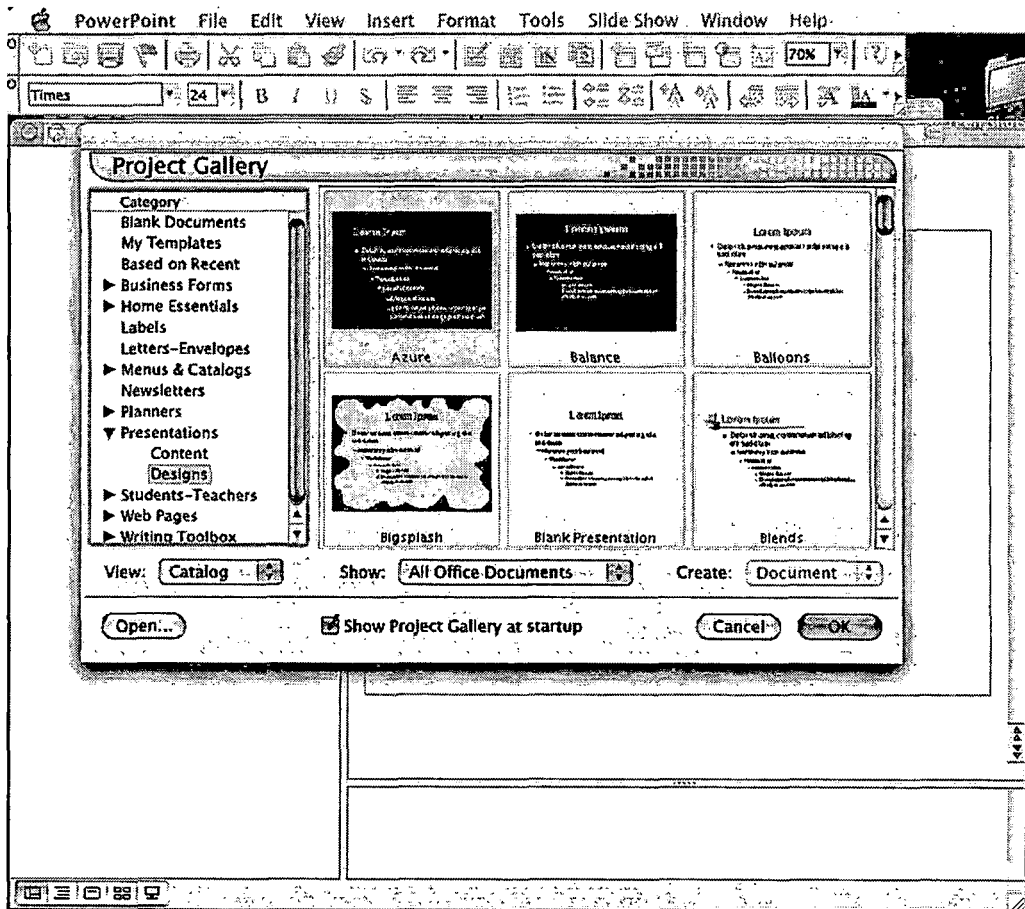
Toolbar:

The PowerPoint Toolbar is similar to the Word toolbar

Select the VIEW Menu and click Toolbars

Chose the toolbar appropriate for your needs

The most like again is Standard and Formatting

Create a simple presentation:

Chose Project Gallery and chose Presentations

Chose a Presentation by Content or Design

Chose Title from the New Slide Dialogue Box

Click on "Click to add title" and type the title to the presentation

Click to add a subtitle

Add any notes for the slide at the bottom
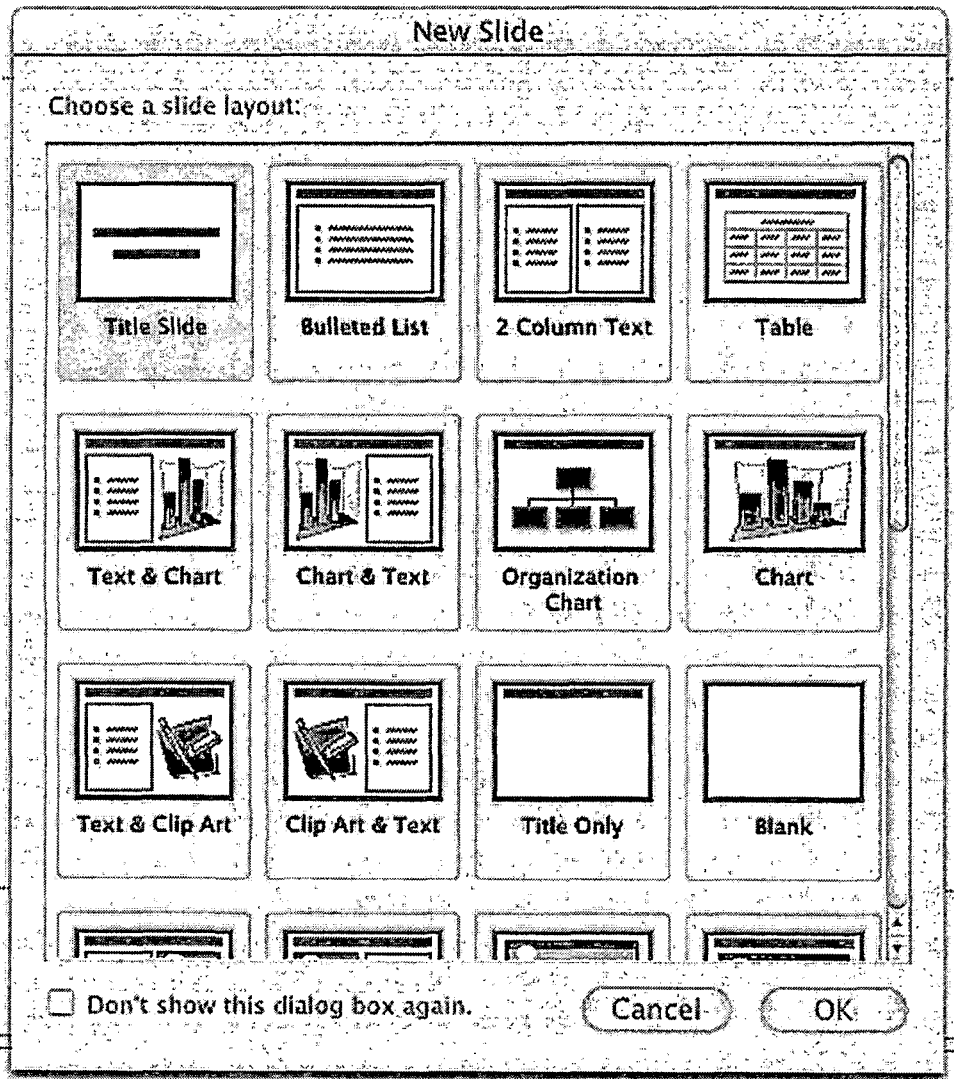
Add more pages:

Select the INSERT Menu and click New Slide

Select the appropriate new slide from the dialogue box

Click on the prewritten titles to change the new slide. Return key to add lines

Repeat the process until complete

View our slideshow:

Select the SLIDE SHOW menu and click View Show

Use the mouse or Return key to change slides

ESC key to end the show at any time

Onscreen buttons:

Create buttons to move slide to slide

Select the SLIDE SHOW menu and Action Buttons

Select NEXT SLIDE OR HOME and draw on the screen where you want the button and select OK

Repeat the process for each slide

Play the show and check the buttons

Animate text:

Insert a new slide

INSERT Menu and Text Box

Add a line of text

Select SLIDE SHOW Menu and Animations

Select how you want the text to show up on the page

Play the show. At that page click the mouse to animate the text

Internet

Internet Explorer:

To see full instructions, open the manual for Internet Explorer. These instructions are for the simple, basic instructions and troubleshooting.

Internet Explorer from Microsoft is the most widely used browser. Netscape is an alternative.

Below is a copy of the browser with titles for the important areas of the interface.
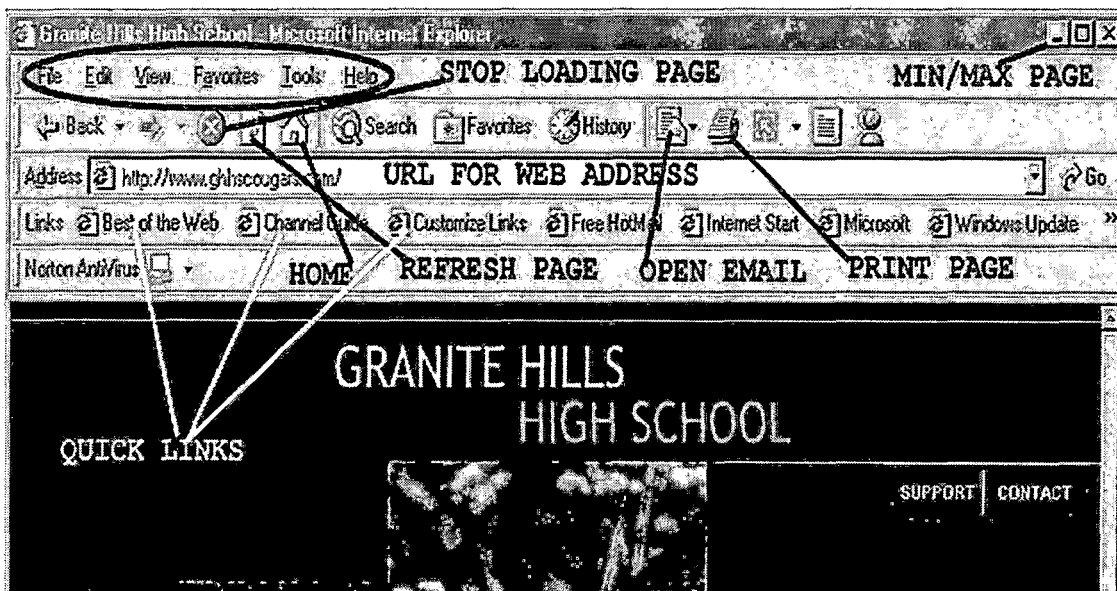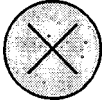
The unlabeled items are either self-explanatory or for more advanced users. The most relevant is Favorites. You can save and retrieve frequently used web address or important addresses.

Internet Explorer will add the http and even the www for most URL's.

Searching the web:

Most wide used site is www.google.com or www.dogpile.com for multiple searches. Also, try www.educationplanet.com for k-12 educators. Try the education side of the Discovery Channel at http://school.discovery.com

- Search tips

  o Use quotation marks "" to group words into a phrase

- o   A plus sign (+) to add a word or phrase

- o   A minus sign (-) to exclude words unrelated to your search

- o   Use AND for a Boolean search

- Buttons:

  - o   ← Back button to return to the previous page. OR click the triangle and see several previous pages.

  - o   →Forward button to return to a page after the one you are currently on.

  - o   Stop loading the current page

- Right-click Menu:

  - o   Back – back one page

  - o   Forward – move forward one page

  - o   Save Background As – save background as a graphic in .gif format

  - o   Set As Wallpaper – replace the current wallpaper on your desktop

  - o   Copy Background – copy background image to the clipboard

  - o   Select All – everything on the viewable page

  - o   Create Shortcut – shortcut to that web site on your desktop

  - o   Add To Favorites – puts current page into your favorites folder

  - o   View Source – for advanced users that want to see the HTML for that page

  - o   Language – reformats the web in the in language it was sent

Other questions should be answered through the help menu or call for assistance.

Frontpage and Dreamweaver

See online tutorial for FrontPage at
http://www.fgcu.edu/support/office2000/frontpage/index.html

See online tutorial for Dreamweaver at
http://www.indiawebdevelopers.com/articles/dreamweaver_tutorial.asp

HTML

History

- Hypertext Markup Language first used in 1989

- HTML instructions to the web browser are called tags that begin and end with < and >

- Each page starts with heading information. All pages start with <html> and end with </html>

  o The / tells the browser this is the end of tat tag or page

- Each page of html must be saved as "text"

Sample

Sample	
<html>	Opens the page
<head>	Opens the heading
<title>name of the page</title>	Open/close page title
</head>	Close heading
<body	Start the page
all the content of the web page	Close what's seen
</body>	Close the page
</html>	

Images

<img src="filename.jpg">

img src tells the browser to see an image, not text.

"filename.jpg" is the saved name of a jpeg picture

pictures can be placed on the page using <align> and left, center or right. </align> is not required with images.

Text

Other material, including text, can be centered with

<center> items to be centered </center>.

text

<I> text </I>

<align="right">text

<align="center"> text

<p> text </p>

<h1> text </h1> (or h2,h3,etc)

text

Center the text
Bold face
Italicize
New paragraph
Line break
Heading type

Links

- Internal links within the web site
  - <a href="name.htm" link name>
- External sites.
  - <a href="http://www.website.com">
- Email link
  - <a href="mailto:name@site.com">

To find other tags consult a text on html or the website at http://www.davesite.com/webstation/html for an interactive tutorial.

Liquid Crystal Projector

This projector can connect with your computer, VCR, DVD player, or cable (through the VCR).

Computer

Your computer will need a second monitor outlet either on the original video card or from a second video card. OR you may purchase a "splitter" with one end connecting to your monitor and the second to the projector. Set your monitor resolution to 800 X 600 or lower, unless your projector specifically states it can go higher. On the Macintosh, open the Monitors window and set to "mirror".

VCR

Panasonic – Basic VCR - front

Power
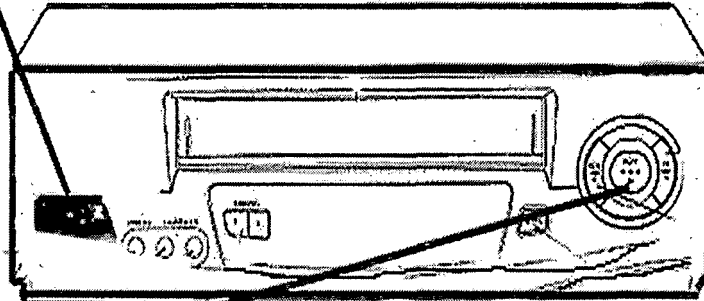
Play -rewind -record

Rear of Panasonic VCR

cable in

Audio IN

Audio OUT

Other Video   In

Out

Cable out to TV
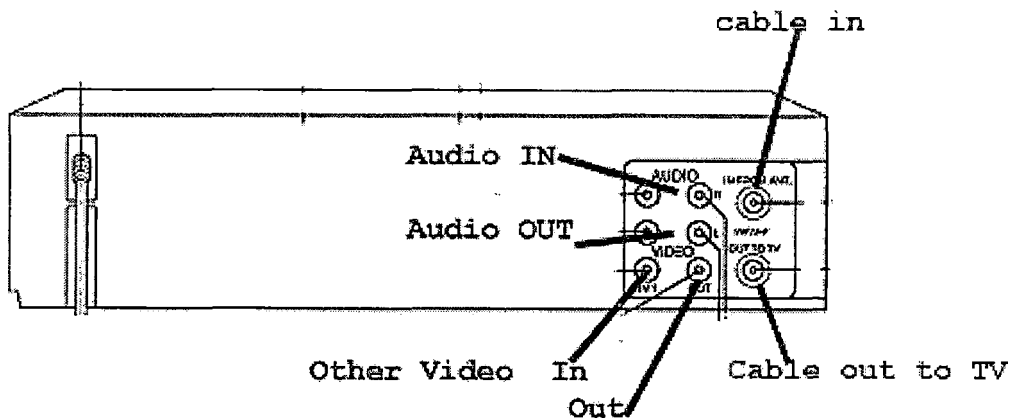
Use the video out to reach your LC projector.

Channels

Set your VCR to channel 3 at all times, unless you are using it as a TV tuner from the cable in. Set your television to channel 3 for most reception.

Many VCR's today have special channels for the RCA in. RCA video is the "yellow" video in the back or front. Many models have RCA inputs in the back and the front. In this case, the back plugs use channel L1, the front

inputs channel L2. If you are using the coaxial input/output (cable), then use channel 3.

RCA input rear   L1

RCA input front   L2

Coaxial input   3

If you have any difficulty, call for help.

DVD Player

Your DVD player is very similar to your VCR. You will have the yellow/red/white RCA inputs and an additional round black plug called "S-video". You may have a third choice that has the appearance of RCA but in fact it is component video. The best signal to your TV is component, next is S-video, and last is standard RCA.

Component Video

S- Optical Audio to

Video ■ Surround Sound
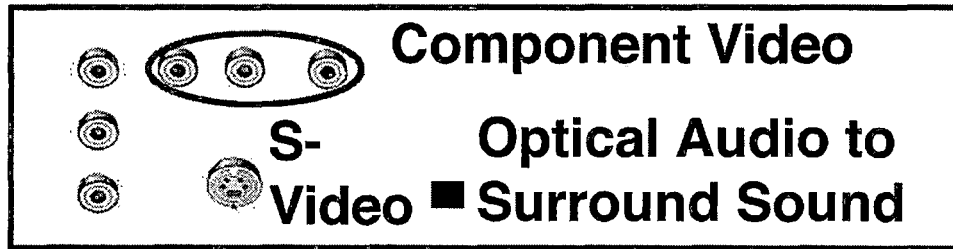
An added bonus is the digital audio also called optical audio. This uses a special cable that connects to surround sound. You may connect speakers to the RCA audio outputs. You can purchase an RCA to mini-plug converter at Radio Shack for under $5. This will allow you to use your computer speakers.

All DVD players are different, though most have the basic above. The key to operation is the remote. The remote control is unique to each brand and model. There are things to look for. Play, stop are standard. There will be a fast word at speeds of 2x up to 32x. You will also have a chapter jump button. Both have buttons for forward and reverse.

Television

Televisions have two or three inputs. The primary is a coaxial cable input in the rear. If this is direct from the wall, then your TV tuner will change the stations. In most cases, if the cable comes from the VCR you will still use the TV to change channels.

Secondary inputs are the yellow/red/white RCA inputs. If they are in the front, then you will also have a set in the rear. These RCA inputs may require you change the input setting for the television. The button will likely be in the front of the TV, under a flap. Changing the button will rotate input from TV to AV1 to AV2. There may be more inputs. Usually AV1 will be the rear input, AV2 the front, and TV the coaxial input.

Common problem hook up

If you have a VCR to TV hookup and have a cable input, you may have trouble. Check these connections.

Cable

Connect the wall cable to the coaxial input on the rear of the VCR. Set the VCR to channel 3. Simple connection: coaxial OUT from the VCR to coaxial IN on the TV. Set VCR to channel 3.

Connect the RCA cables from the OUTPUT on the rear of the VCR to the RCA INPUT on the rear of the TV. Use the tuner on the television to change channels. Common mistake: be sure the power is ON the VCR. Set the input button to TV if you use a coaxial connection from the VCR to the TV.

VCR playback

Connect the RCA cables OUTPUT on the rear of the VCR to either the front or the rear RCA INPUT connections on the television. Change the channel on the VCR to L1 and use the tuner on the TV to change channels. Be sure the power is on the VCR. Set the input button on the TV to AV1 for rear connection or AV2 for the front connection.

Video Camera

Purchasing a camera

If you are about to purchase your first video camera, consider the following. VHS-C needs a small box to convert the small size tape for use in your VCR. This could damage your VCR. You can avoid this by using the camera as your VCR. A better quality, but with the same drawbacks is VHSC-S.

8mm and digital 8 are good quality formats, but they are not the standard size. You may find most non-standard formats discontinued in the near future.

The standard video format for digital video is mini-dv. This may also be known as a "firewire" or "IE1394". You can only record for sixty minutes in standard mode, whereas 8mm can record up to two hours.

When you purchase the video camera, be sure you buy a camera with an external microphone input. That assures you can plug in a microphone, disconnecting the internal microphone. This is essential to good audio on your videotape. If you are purchasing a VHS-C because you will spend much less for that camera, then you may not be able to add the microphone input. VHS-C cameras are usually under $350, while digital video cameras with mic input will start at about $600.

Basic operation of the camera

There are a few things to remember that can greatly improve the quality of your video, regardless of your experience.

Use a tripod. This simple device will steady your camera and keep the viewer from becoming "seasick" when watching your show. A respectable tripod can cost as little $50 - $75. If you plan to use your camera once a week, or will allow students to use the camera, then invest in a better quality tripod. This may cost $200 - $300. Of course, you may spend a great deal more if you plan to be a frequent high-end user.

Purchase two or three "wired" microphones from Best-Buy or Radio Shack. Include a 3-way splitter so all three may be used simultaneously. Poor sound quality will destroy your video. Wire any subject with a speaking part. The internal microphone will fade or include all sound. In any case the sound quality will have an echo.

A hand-held microphone is a possibility, but purchase a stand. Subjects will move their hand around the mic add an unwanted scratching sound.

Add lighting to classroom projects. Studio lighting is very expensive. You can purchase floodlights from a local hardware store. A cheap one has a clip attached. Hook the light on the ceiling so you don't have shadows on the background. Light from both the left and right sides, at about a 45 degree angle. You can further improve lighting quality by adding a third light a few feet behind the subject. Do not allow the lights to enter the picture.

If sunlight is one source of light, block it out. Indoor and outdoor lighting are very different and will change to overall color of your video. Use either outdoor or indoor lighting, but not both.

Check your white balance. This tells the camera what kind of light to expect. Find your recording settings and look for white balance. Usually, you will find a "light bulb", or "sun", and an "auto" setting. Inexperienced users should use the auto setting; otherwise adjust to where you are.

When taping outdoors, keep the sun behind you. If the sun is behind your subject you will be able to see well through the viewfinder but the actual tape will shade your subject. The result may be only a silhouette of your subject. Keep the sun behind you within 45 degrees to your left or right.

When students must remember lines, use a computer as a teleprompter. A laptop works best, but any computer with word processing software will do. Type out all the dialogue with your word processor. Start each section with the students' name, in all caps, that will read. Use phonetic spelling for difficult words. Good pronunciation is more desirable than good spelling.

Place the computer monitor under the camera, as close as possible, and a student to press the down arrow or page down button as needed.

Allow extra footage. Be sure the tape has been running for three to five seconds before any action occurs. Delete unwanted footage in the editing process. Do the same at the end of the scene. Stop the actions, count to five, and then stop the camera.

Student projects will have mistakes. To assist students to edit out mistakes, shoot each scene twice. The second taping should be from a different angle. This change will allow the editor to cut out a mistake. The change of angle eliminates the "jump" look that would occur if the angle did not change.

Finally, clearly mark the tape. If all projects are on a single tape, be sure to keep a continuous timecode on the tape. Additionally, you should log all shots. That is, the start timecode on the tape, the group, what scene, the shot, and the ending timecode. This will help reduce taping over another students work.

Editing Your Tape

This is where you will appreciate firewire. If you are editing on a computer you will need a capture device and editing software. If you have a Macintosh, you should already have a firewire connect.

We recommend that you use basic editing software such as iMovie2 from Apple or Movie Maker on the Windows XP platform. They are free with the operating system. If you have already taped your program, you may want a hands-on tutorial. This is a good place to call for help.

APPENDIX B

INSTITUTIONAL REVIEW BOARD REQUEST

Application to Use Human Participants in Research

1. **PROJECT REVIEW**
   X New Project (ID# will be assigned by the IRB) _____
   ☐ Revised Project (Enter ID#) _____
   ☐ Renewal (Enter ID#) _____
   Approximate date of most recent **previous** review of this project _____

2. **INVESTIGATOR(S) NAME(S) __Henry Frank (Hank) Richards__**
   Department _Education – Instructional Technology_ Phone _760-242-4649_
   E-mail Address: ___hank.richards@gte.net___

   If you are a **student**, please provide the following information:
   This research is for   X Thesis   ☐ Honors Project   ☐ Independent Study
                           ☐ Course _____   ☐ Other _____

3. **PROJECT TITLE ___Transparent Technology in the Classroom___**

4. **DESCRIPTION OF PARTICIPANTS** (Enter approx. no. of participants and categories that apply)
   Number __5____   Gender: ☐ Female ☐ Male
   ☐ CSUSB Students ☐ Children (17 or younger) ☐ Child Development Center
   ☐ Prisoners   ☐ Patients in institutions   X Other Teachers at Granite
                                                                 Hills High School

5. **IS THIS RESEARCH BEING SUBMITTED AS PART OF A FUNDED RESEARCH PROPOSAL?   ☐ Yes X No**

   If yes, you must submit one complete copy of that proposal as soon as it is available and respond to the following questions:

   Does the funding agency require notification of Institutional Review Board approval?   ☐ Yes   ☐ No

   (If yes, please provide the IRB Secretary with one copy of all relevant forms, instructions, etc., with your original copy of this application.)
   Project period from _____ to _____

6.   INDICATE THE REVIEW CATEGORY FOR WHICH YOU ARE APPLYING.

. X   I am applying for **exempt review,** based on the following category(ies): (Check all that apply. Submit an original and one copy of all application materials to the IRB.)

> X   Research conducted in established or commonly accepted educational settings and involving normal educational practices
>
> ☐   Research involving the use of educational tests, if information from these sources is recorded in such a manner that participants cannot be identified in any way
>
> X   Research involving survey or interview procedures where participants cannot be identified
>
> ☐   Research involving the observation of public behavior where participants cannot be identified
>
> ☐   Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, where these sources are publicly available or where participants cannot be identified

☐   I am applying for **expedited review,** based on the following category(ies): (Check all that apply. Submit an original and 1 copy of all application materials to the IRB.)

> ☐   Collection of hair, nail clippings, teeth in a non-disfiguring manner.
>
> ☐   Collection of excretal and/or external secretions.
>
> ☐   Recording of data from adults using noninvasive procedures.
>
> ☐   Collection of moderate levels of blood samples from adults in good health.
>
> ☐   Collection of supra- and sub-gingival dental plaque and calculus.
>
> ☐   Voice recordings made for research purposes.
>
> ☐   Moderate exercise by healthy volunteers.
>
> ☐   Study of existing data, documents, records, or pathological or diagnostic specimens.
>
> ☐   Non-manipulative, non-stressful research on group or individual behavior.

☐   I am applying for **full board review.**
·   (Submit an original and 1 copy of all application materials to the IRB.)

7.   ATTACHMENTS. I have included copies of all relevant project materials and documents, including (check all that apply):

X   Surveys, questionnaires, and/or interview instruments.
☐   Informed consent forms or statements.
☐   Letters of approval from cooperative agencies, schools, or education boards.
☐   Debriefing statements or explanation sheet.

8. AFFIRMATION OF COMPLIANCE:

I agree to follow the procedures outlined in the summary description and any attachments to ensure that the rights and welfare of human participants in my project are properly protected. I understand that the study will not commence until I have received approval of these procedures from the IRB or where appropriate a department Human Participants Review Board; I have complied with any required modifications in connection with that approval. I understand that additions to or changes in the procedures involving human participants, or any problems with the rights or welfare of the human participants must be promptly reported to the IRB. I further understand that if the project continues for more than one year from the approval date, it must be re-submitted as a renewal application.

Signature of Investigator	Date

Signature of Co-Investigator	Date

APPROVAL OF FACULTY ADVISOR/SPONSOR
(Required for all investigators who are students)

I affirm the accuracy of this application, and I accept responsibility for the conduct of this research, the supervision of human participants, and maintenance of informed consent documentation as required by the IRB.

Printed Name of Faculty Advisor/Sponsor	Campus Phone

Signature of Faculty Advisor/Sponsor	Date

E-mail Address of Faculty Advisor/Sponsor

APPROVAL OF A LICENSED PHYSICIAN (Required only if the project involves medical procedures and neither the investigator nor the faculty/advisor is a licensed physician)

Printed Name of Licensed Physician	Contact Phone

Signature of Licensed Physician	Date

9. PARTICIPANT RECRUITMENT.

All participants are adult teachers at Granite Hills High School in Apple Valley, California. I will chose five participants from a larger group of high school teachers that need assistance using technology and have asked for assistance. Each has enrolled in a school sponsored weekly class (on campus) on use of school computers and technology. Age, gender, and ethnic background are not issues of the questionnaire, nor does it have any bearing on their selection. There is no reason to believe any participants are not of good mental and physical health.

10. PROJECT DESCRIPTION.

My project involves creating a booklet that teachers can use when they have difficulty with their classroom technology. The thesis is making instructional technology transparent to users. Teachers can work toward competence without waiting for technical personnel to arrive and instruct. With the self-help guide, the teachers can become independent users of technology. Participants will be interviewed individually, one time only, in their classroom, after school. The length of the interview should be less than thirty minutes per participant. After completion of the project, I will distribute the completed project to the participants for their use and evaluation. I will correct any errors or omissions at that time. I will arrange time after school with each participant to observe their use of the completed project and if in fact, it is useful for them.

11. CONFIDENTIALITY OF THE DATA.

All data will be stored in a locked, fireproof cabinet. No participants will be identified beyond the interviewer. Interview sheets will be anonymous, and identified only by a number known only to the interviewer.

12. RISKS AND BENEFITS.

The author cannot think of any short or long-term risks to the participants. Interviewed teachers are already aware they lack certain skills to operate advanced technical equipment. They are aware the school and the interviewer are seeking methods to assist their request to become competent users of available technology. Interviewed participants will be aware that a benefit of their participation will be additional tools to assist them in their quest to become proficient with technology in their classroom. Their improved ability will help them to become more versatile teachers for their high school students.

13. INFORMED CONSENT.

I request waiver of informed consent. The adult teachers are volunteering their time to attend weekly sessions to help them learn how to use the technology available for their classroom. I work with all participants and have known some for several years. The questions are general questions and all answers are confidential. No information will be passed to others, except in aggregate in my thesis.

14. **DEBRIEFING STATEMENT.**
Participants will be made aware of the uses of the interview at the time they are interviewed. Participants will be given a copy of the tool chosen to assist teachers. This may be a web page or flip chart, or other tool derived from their responses. Participants will receive a copy of the instructional device as it is made available to all teachers and staff at Granite Hills High School.

Technology Survey
Transparent Technology
Hank Richards

Teacher/Interviewee #_____

We have asked you to participate because you are at an introductory level at one or more of the technology tools we use at Granite Hills High School. The end use of this interview is to create a tool or tools, to assist instructors to adapt our technologies into their curriculum.

1.   What is your area of teaching?

   Math   Science English Social Science   Fine Arts   Foreign Language Elective

2.   Do you have a computer available for use at home?

3.   Do you use an LCD projector in your classroom?

4.   Do you use creation tools for lessons? (Video camera, digital camera, PowerPoint, etc.)

5.   Do you integrate any technology into your lesson plans?

   5a.   If so, how?

6.   Do your students use technology for your projects?

7.   Do you use technology personally to?

		Weekly	Monthly
7a.	Create instructional materials?		
7b.	Use with classroom instruction?		
7c.	Student grades?		
7d.	Email teachers, administrators, parents?		
7e.	Collect information for lesson plans?		
7f.	Access lesson plans from web sites?		

8.   Do you feel you have adequate training to use technology in your classroom?

9. What tools do you need training to use in the classroom? (Select all that apply)

		Problem Area
9a.	Basic computer use. Windows or Mac.	
9b.	Internet.	
9c.	Email.	
9d.	VCR and TV.	
9e.	DVD player.	
9f.	LCD projector.	
9g.	Grading program.	
9h.	Aries attendance system.	
9i.	Microsoft Word.	
9j.	Microsoft PowerPoint.	
9k.	Digital video camera and software.	
9l.	Other?	

10. What method of training would best serve your needs? (select two)

10a	After school in-service.	
10b	Videotape.	
10c.	Desktop flip chart.	
10d	Web page.	
10e	3-ring binder.	
10f.	Reference book for each tool.	

11. Post project.

11a. Participant was observed using the project on __/__/__.
Participants' comments.

11.b Participant did did not use the project to their satisfaction.

11c. Participants suggestions.

I agree to follow the procedures outlined in the summary description and any attachments to ensure that the rights and welfare of human participants in my project are properly protected. I understand that the study will not commence until I have received approval of these procedures from the IRB or where appropriate a department Human Participants Review Board; I have complied with any required modifications in connection with that approval. I understand that additions to or changes in the procedures involving human participants, or any problems with the rights or welfare of the human participants must be promptly reported to the IRB. I further understand that if the project continues for more than one year from the approval date, it must be re-submitted as a renewal application.

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