

Chapter 8: E-Learning and Information Literacy

Chapter 8
E-Learning and Information Literacy

I think we have a data overload and yet we have very few people who are actually able to use information successfully.

John Sculley (1939 -), past CEO of Apple Computer

When thou enter a city, abide by its customs.

The Talmud

The breakthrough opportunity is to increase learning through transformations in the social participation of learners in different communities for knowledge building.

Roy D. Pea et al

LEARNING OUTCOMES

The Internet may be the best thing since sliced bread. It certainly is the most significant agent of educational change since the printing press and movable type¹. Because of it, education at all levels K through college is undergoing a transformation that is affecting how teachers teach and how children learn. The Internet is everywhere, reaching into every nook and cranny of our world. As we saw in Chapter 7, telecommunications companies worldwide are racing to develop systems capable of coping with the rapidly increasing demand for Internet-based communications services, which will give people well nigh instant access to the data they need to help them plan—and enjoy—their lives.

Integration of the Internet (and soon Internet 2) into the everyday process of teaching and learning is happening, but not at the speed of technological change. "Powerful ideas," Kay (1994) observed, "create needs only they can fill. This is the essence of paradigm shifting [which], as Kuhn noted, takes longer than one would think or hope."

So much has to happen first, and it's not just a question of the technology. Schools have to prepare teachers to use the technology and to incorporate it into their curricula. Many schools still have to invest in, and install, not just computers, but a sufficient number of networked, Internet-ready computers to make their instructional use feasible. Many schools still have to be wired for high speed, ideally fiber-optic, access to the Internet.

Today's teachers-in-training need to be ready for the *paradigm shift*² that is coming to education. If the last two decades were the Age of Information, the early 21st Century is the

¹ Although the Chinese also invented a printing press, the press invented by Johann Gutenberg in c1450 is the focal event in the Western world.

² A paradigm shift is a radical change in the way an essential component of one's world (eg. education) is viewed by a culture or community.

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Age of Information Fluency; using the Internet and other network resources effectively to develop learning and learning skills is an essential component of the toolkit of today's teachers. Included in this new fluency (or *literacy*) are problem-solving, communication and collaboration skills, as well as the 3 R's. It is inevitable that schools will turn to e-Learning for the development of 21st Century Fluency skills. Hence this chapter in our book.

In the pages that follow you will first be asked to reflect upon the learning process in general, and then to apply learning theory to teaching with new technologies. You will examine the concept of e-Learning in general, and of distance learning, videoconferencing and collaborative projects in particular. We will end with a look at Information Literacy skills and address some of the educational concerns that inevitably accompany use of the Internet in the classroom.

- Reflections on the Learning Process
 - Data rich, information poor
 - The transfer of data to information is a unique individual experience
- What is e-Learning?
 - Why e-Learning is important
 - The e-Learning environment
 - The many elements of e-Learning
 - A Distance Learning Example
 - Tools for e-Learning
 - Model e-Learning projects
 - Design Considerations for Effective e-Learning
- Information Literacy and Internet Concerns
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 - PICS: The Platform for Internet Content Selection
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 - Other problems with Internet use

REFLECTIONS ON THE LEARNING PROCESS

Education is all about helping learners learn and this process involves a lot more than a casual acquaintance with data such as happens when surfing the web. Too often students and teachers equate the collection and organization of Internet data with learning. We would not, in a science lesson, equate creating a chart of data about distances traveled by test egg mobiles with

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an understanding of the first law of motion. The same distinction applies to all Internet activities. It is essential to make the distinction in the learning process, at all levels of education, between collected and organized "data," "information" that leads to "knowledge," and the "wisdom" that comes with "understanding" knowledge. As we will see, technology can play a larger role in this process than simply facilitating the collection and organization of data.

Data Rich, Knowledge Poor

Teachers more than most other professionals should understand and appreciate the difference between *data* and *information*. Data³ are the raw material of information. Data are organized symbols (numbers, letters, pictures) that are representative of events. Data have no *meaning* per se—in and of themselves. Meaning implies understanding, which implies cognitive activity of some kind. Data are like the bricks and mortar and other materials that make up a building. It's only when the builder puts everything together and people move into it that the house becomes a home. Likewise, it's only when the brain makes sense of the data—once the mind acknowledges and assimilates the data—that they become information.

Shannon and Weaver (1949) define information as data which "reduce uncertainty"—data which bring greater understanding, lead the mind to new awareness of the world, are accompanied, perhaps, by an element of surprise (the "aha" response).

So we are not informed when we are told something we already know. If we open a book and read that "2+2=4" nothing much happens in our mind, except perhaps the question: "Why on earth am I reading this book?" No, we are *informed* when the data we come across (read about, experience, are told) extends and enriches our mind in the short or long term. When we are informed our minds, and thus our lives, in some very real sense are changed.

Debons et al. (1988) are careful as Information Scientists to delineate a continuum they call the Knowledge Spectrum (Fig. 8.1 on next page). The continuum starts with an occurrence called an *Event* which constitutes "some condition or change in the state of the world." The Event is captured in our minds using *Symbols*—essentially meaningless representations requiring *Rules and Formulations* to give them significance. Once the symbolic representation of the event has been organized using the rules and formulations, *Data* are produced. Strictly speaking, the mind has not yet been engaged. We are in the *Data Driven Segment* of the continuum.

Once data is acknowledged by the senses, the mind (cognition) becomes involved. If the data "reduce uncertainty" *information* results from the experience. The mind is literally changed physically—new connections are made in the brain—by the growth in knowledge that information in this Debonian sense brings. As Oliver Wendell Holmes observed: "The mind, stretched by a new idea, never goes back to its original dimension." We are now in the *Cognitive Driven Segment* of the Knowledge Spectrum.

The information is added to the mind's store of *knowledge* when the intellect brings understanding to bear on the information, enabling the mind to use the knowledge "to analyze situations and to put things into their proper perspective" (Debons, 1988).

³ Data is the plural form of the word. Datum is the singular form. Strictly speaking, one should say "a datum *is*..." and "data *are*..." However, in everyday usage Data is used as a singular or plural noun. Thus it is correct to say either "Data *is*..." or "Data *are*...". (you will find both in this text). According to Webster's Random House Dictionary (1991 edition), the word "datum" is rarely used.

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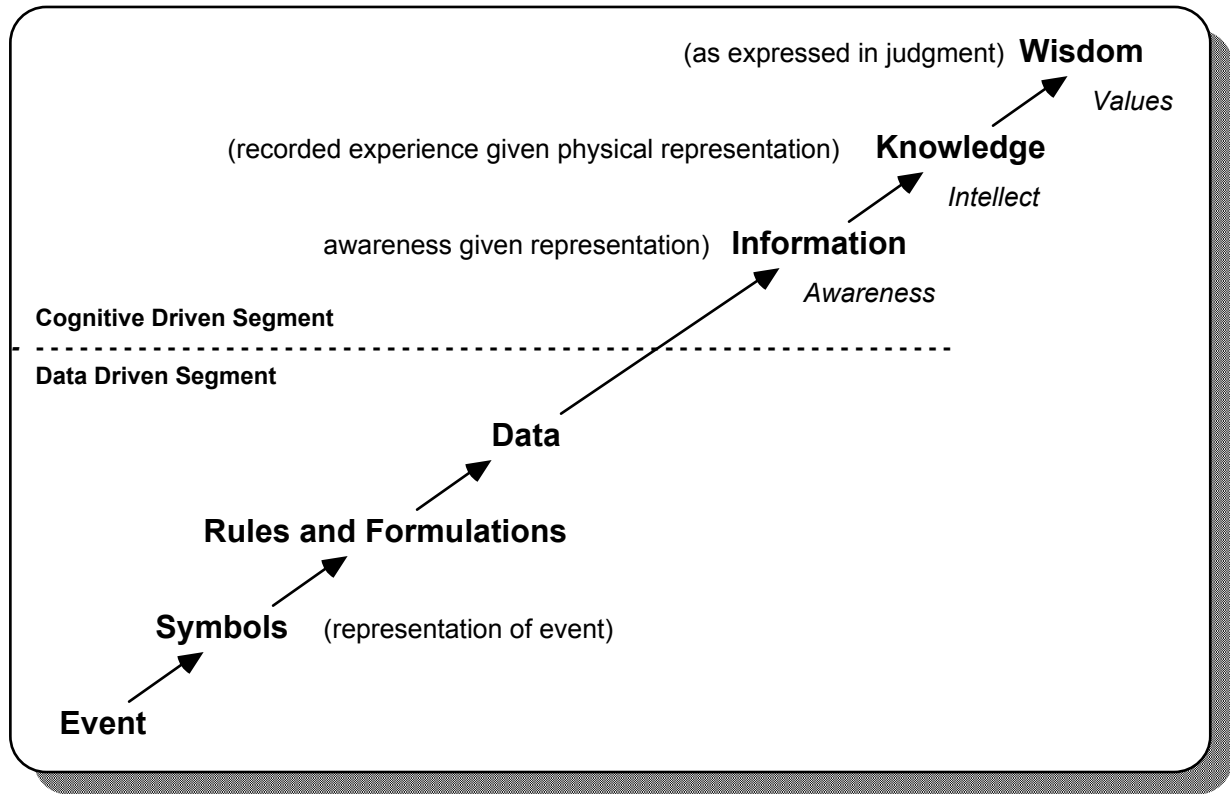


Fig. 8.1 The Knowledge Spectrum

Problem-solving does not happen in a vacuum; it arises from a knowledge base sustained by an informed mind. The final stage in the Knowledge Spectrum is *wisdom*, which brings a set of values to bear on judgments that call on the store of knowledge accumulated through experience.

If it is true that knowledge is power and that those with access to knowledge can compete most effectively for a fair share of the available "wealth" generated in a society; if it is also true that education is the primary formative experience that puts the keys of knowledge acquisition into a child's hands, then it follows that education is in every sense *the* key to survival in today's information society.

Every teacher is an educator with a mandate to educate—the word comes from the Latin *educere*, which means to lead out, to lead from, to challenge, to cause to advance. A prerequisite for the formation of an educated individual is the establishment of an environment in which that mind will be encouraged and stimulated to experience a multi-faceted world at a level that is consonant with each individual's stage of cognitive development.

The Transfer of Data to Information is a Unique Individual Experience

Debons (1988) describes the process whereby data are *acquired, transmitted, processed* and *utilized* on the way to becoming of value in decision-making. This Debonian model of an information system includes another key component—*transfer*—which is the end product of an

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information system. This is when the data, because they are new⁴, impact the human mind, reducing uncertainty and forever changing the individual's knowledge base.

For the teacher this has many powerful implications, not least of which are the following:

A student is not informed by the mere attempt to convey data.

Remind yourself of how many times you have sat through a class, or read page after page of a book, and neither averted to, nor understood, a single thing!

A student is not informed when the data are already known.

Remind yourself of how many times you have sat through a class, or read page after page of a book, and learned nothing you didn't know before! Indeed a common criticism of poorly designed computer-based learning is that it expects students to mindlessly review material that is already thoroughly learned. On the other hand, well-designed computer-based learning will recognize and remember individual student characteristics and capabilities, and will challenge the user to move to higher levels of learning by addressing that individual's unique learning needs.

One student will not experience the Event the same way as another student.

Howard Gardner (1993, 1999) has theorized that we all differ from one another in the balance of "intelligences" that make up our minds. We don't all learn the same way and we each have optimal learning strengths among the eight or nine types of intelligence that we bring to the classroom. Additionally, students bring to the classroom differing Learning Styles⁵; each will follow the Knowledge Spectrum path differently, responding to different Events at different times delivered differently.

Moreover, cognitive development is not a linear, but a cyclical process. As described by Fischer and Rose (1998), the student learner will repeat the move from Event to Wisdom at different speeds, from different cognitive base levels, and with differing levels of accomplishment throughout the school years.

The transformation (transfer) of data to information is thus a unique, individual experience even when shared with others. Unfortunately this individualization of learning is difficult to achieve when most teachers are expected to work with many students at once. The typical teacher-pupil ratio, while much better than a hundred years ago, is still unsatisfactorily disproportionate in most of the classrooms in our schools. While the national average in U.S. public schools is about 17 students per teacher, this average belies the fact that most teachers have closer to 25 students in their classes. 10-15 students per class should be the norm. 1-1 would be an ideal.

Tailoring course content to individual needs is thus a major challenge for even the best teachers when they have to plan lessons for so many students. Teaching teams is one solution for the classroom; another is the "pull-out" program for both enrichment and remediation. As you

⁴ Data can be "new" even when it is old. I can know what a particular piece of music sounds like, but at some later time I may relive the newness at a deeper level of familiar experience.

⁵ Although there are many descriptions and classifications of Learning Styles, the agreed upon core is VAK (Visual, Auditory, and Kinesthetic).

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might expect, technology also comes to the rescue. In Chapters 5 and 6 we took a look at some of the commercially available software and web-based packages for "integrated learning." These combine varied, multimedia instruction and drill with individualized assessment. The best of them also generate a "formative assessment," providing not only the means but also the materials for improving learning in problem areas. Because such a solution is delivered over a network, it falls under the umbrella of "e-Learning." Although we will not expand upon "integrated learning" systems in the chapter, we ask you to keep them in mind as you learn about other models and modes. Other e-Learning solutions, such as WebQuests and Hunts, will be discussed in Chapter 9, when we look at the Internet as a source of learning activities as well as data.

WHAT IS E-LEARNING?

e-Learning means different things to different people. In the context of this book, we can define e-Learning as *learning that takes places over a network*. This mode of learning existed before computers. Women in various societies have used the postal network to gain educations otherwise denied to them. Since the early 1900s, radio was used to bring education to students in remote locations of the Australian outback. Closed-circuit TV also has been used for this purpose. The introduction of the networked computer into the mix has brought e-Learning to center stage because, with the Internet, the learning community is global. The learning may involve a teacher at one end of the line and students, singly or in groups, at the other. Alternatively, students from different schools (local, national, or international) may be networked together for purposes of interaction, discussion, joint project work, and so on.

Why e-Learning is important

Up to this point, this text has been devoted to convincing you, the future teacher, that technology can enrich the classroom learning experience and facilitate the many "outside the classroom" tasks and responsibilities you will face. You have been introduced to an exciting new, digital world, in which boundaries are stretched to global, and extra-global, proportions and tools are portable, multi-faceted and always "on." It is time now to show you how this vision can in fact become a learning environment for your students. This is e-Learning.

We will see that e-Learning promotes not only technology fluency, but also the 21Century skills of problem-solving, communication and collaboration. It has another important value: it promotes diversity values.

The United States, along with societies the world over, is becoming increasingly diverse in terms of its population. The melting pot is still a long, long way from evolving into a culturally homogeneous mass. Multiculturalism is a key focus in education because children need to learn about, and live with, diversity more than ever before. Just as knowledge is power, so awareness and understanding of difference will promote acceptance of difference and lead to a more equitable society where the rights of all, regardless of race or gender, are given an equally sympathetic ear.

e-Learning serves the goals of multiculturalism by enabling students in rural communities to reach out to those in urban areas; it is enabling students in wealthy districts to interact with those less well-endowed; it is enabling students of one racial background to collaborate on

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multicultural projects with those from another. In pockets of progress, some of which have been profiled above, distance education is making a difference⁶.

As networking technology takes increasing hold in schools, these cross-cultural, cross-race, cross-economic interactions⁷ will become the rule, rather than the exception. While this interaction will not remove differences of culture, race, and economic status, it will open children's eyes to the realities of those differences and help them to become more tolerant toward each other. It is the duty of every teacher to work with the families and the communities to promote multiculturalism with a view to breaking down prejudice, replacing it with a celebration of diversity. Appendix D further explores this topic.

The e-Learning environment

Keep the conventional classroom in mind as you read this list of the traits shared by most e-Learning experiences:

- *Learning can take place anywhere.* Because the "learning content" is accessed over a network, it is available anywhere the network can be accessed. As you now know, this can be at the beach, in bed, in an airplane, in the space shuttle, at the bottom of the sea. The physical boundary of the classroom is not required for e-Learning.
- *Learning can take place at any time.* Similarly, the time-frame for learning is determined not by a schedule of bells, but by the preferences of the student(s). The exceptions to the anytime rule are teleconferencing, videoconferencing, and chat, which are synchronous events.
- *Learning content is available in multiple media.* The e-Learning experience is accessible in a multitude of ways. Typical experiences include text, audio and visual content, in both synchronous and asynchronous modes.
- *Learning is not a one-shot experience.* Essential to e-Learning is the ability of the student to revisit "data" and "information." This is possible because learning "assets"⁸ are digital and *a student's contact with data becomes part of the digital archive.* Chats, e-mail, online conferences, activities, drills, assignments and assessments are part of an individual's learning experience archive.
- *Learning does not require the physical presence of a teacher.* What?? Well, you know about videoconferencing, streaming video, chat, bulletin boards, blogs, podcasts, and web pages. Imagine teaching students using only these tools. A paradigm shift, to be sure, for, as we have discussed often in this text, 1-1 or face-to-face is often the most effective communication mode of all. However, imagine how useful it would be for the visual learner to have a lesson digitally "replayed" over the Internet; or for the tactile,

⁶ An example of this is taking place in rural New Zealand and Australia, where remote schools are sharing network connections and classroom experiences.

⁷ Seymour Papert and others would add "cross-generational" to this list.

⁸ You will remember from Chapter 5 that any individual snip of learning content can be digitally archived for retrieval and reuse—this creates an "asset."

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concrete learner to be able to read and reread a lecture while listening to a voice recording or digital speech.

- *Learning does not require the physical presence of other students.* This makes more sense, probably. As we discussed in Chapter 7, networks and the Internet create a potential global community. Which brings us to one of the most powerful aspects of e-Learning:
- *Learning requires Communication:*
 - *The learning process supports, encourages and often requires Cooperation.* Cooperation can be defined as two or more individuals contributing to a set of Information or to a learning outcome or project. Contributions can be images, URL's, data, journals, e-mail messages, or IM's. Cooperation is not, of course, a new teaching method. "Two minds are better than one, four hands are better than two" is a very old adage and the best e-Learning events take advantage of it.
 - *The learning process supports, encourages and often requires Collaboration.* Collaboration can be simply defined as two or more individuals sharing Understanding and providing mutual feedback. The best teachers recognize that their role is often to collaborate with the student, and this is even truer with e-Learning events. The network, however, allows for an unlimited number of collaborators, many of whom the e-Learning student will never meet face-to-face.
 - *The learning process requires Problem-Solving.* Drill and practice within a "known" data set is not e-Learning (although there is too much educational software that pretends that this is true). Problem-solving activities are an essential component of the challenges that require cooperation and collaboration.

It is through cooperation and collaboration that the individual's learning experience is most enriched. Further, problem-solving challenges not only stretch students to achieve Knowledge at a higher cognitive level (Fischer, 1998), they serve to motivate students. Roschelle and others, in their review of the effects of new technologies on learning, note that "performing a task with others provides an opportunity not only to imitate what others are doing, but also to discuss the task and make thinking visible...Reports from researchers and teachers suggest that students who participate in computer-connected learning networks show increased motivation, a deeper understanding of concepts, and an increased willingness to tackle difficult questions." (2000).

That said, e-Learning takes a multitude of forms, ranging from a single student researching "whales" on the Internet and reporting back to a teacher, to global collaborative research projects in which students at multiple sites and levels collect, share and analyze data and then share their new Understanding with teachers and scientists.

Fig. 8.2 demonstrates the possibilities for e-Learning activity structures. The "star" at the center of the diagram is the "core" of e-Learning that we will explore later in this chapter.

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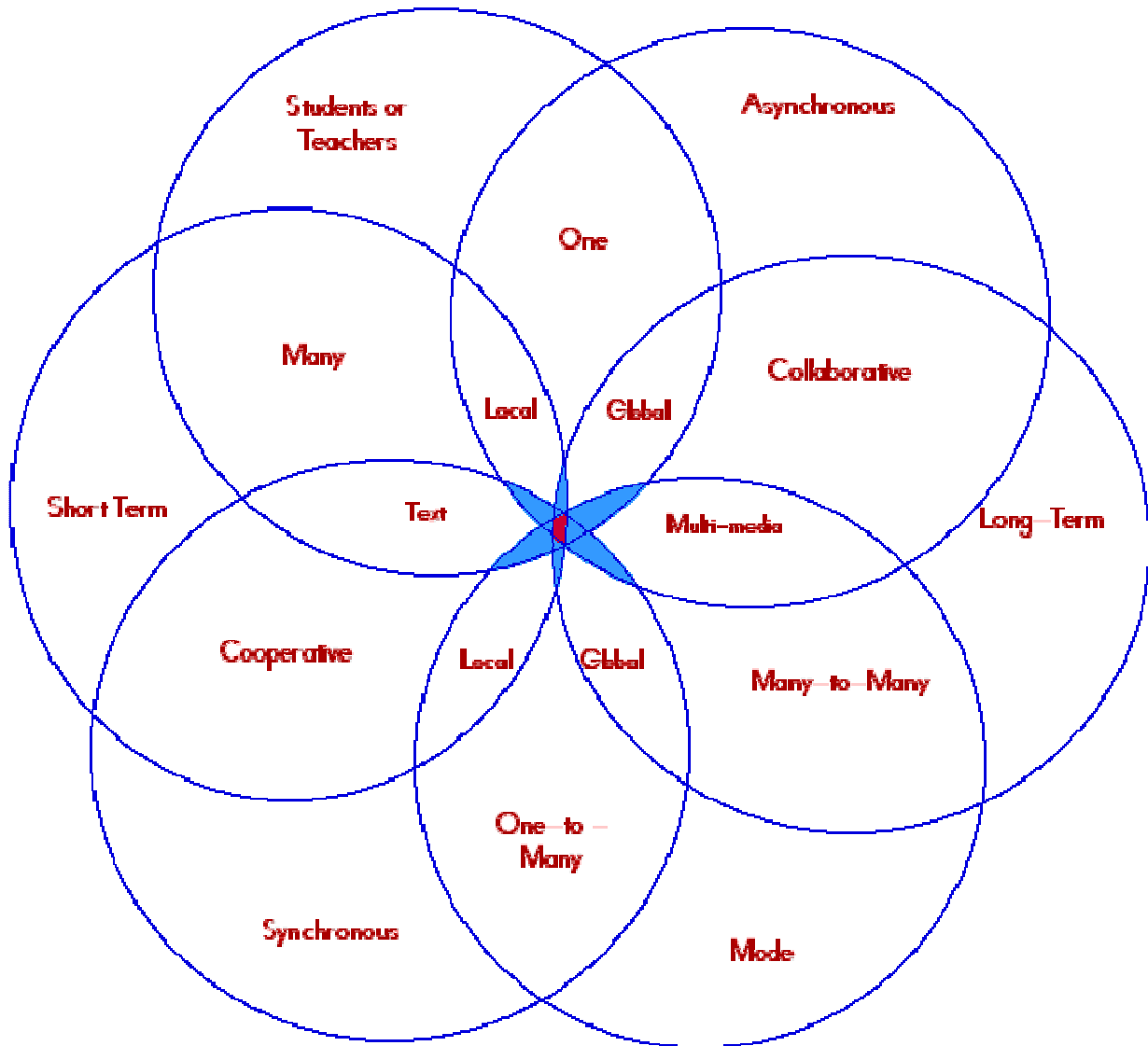


Fig. 8.2 The many possibilities for e-Learning

For now, let us follow an example of an e-Learning activity that falls under the umbrella of what is often called "Distance Learning." In this model, a teacher uses the Internet (or LAN) to instruct students in a remote location. It is characteristic of Distance Learning for multiple means of communication, cooperation and collaboration be available to students. We will be looking at videoconferencing and Internet collaborations as well.

A Distance Learning Example

A striking example of the effectiveness of Distance Learning is provided by Richard Wallace, who teaches at Ballyclare High School in Northern Ireland. Here is his account of the year he used Distance Learning to prepare his students for the national United Kingdom General Certificate of Secondary Education (GCSE) exam in Information & Communications

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Technology (ICT). The Blackboard Course Management System (CMS) was used to manage online discussions and the exchange of learning materials and assignments.

As a result of my International Masters last year I decided to radically alter my teaching methodology with one particular class. They were very bright, highly motivated pupils and would have had little or no trouble passing their ICT GCSE whether or not I had changed the way I taught. I had been challenged by the work we did on the Masters to re-examine the effectiveness of my teaching and to investigate the use of online or elearning in a school situation. After 30 years in the same school teaching the same subject I suppose I just believed that 'I taught and they learned' and that was the end of the story. That was a mistake on my part.

We began the year together by having a chat and follow up discussion on what type of teacher they would like me to be. From that process I discovered that they wanted a teacher who knew what he/she was talking about; a teacher who trusted and respected them; one who provided notes that were sufficiently detailed but not excessive; one who highlighted the key points; one who was aware that they learned in different ways and who made an effort to accommodate this; one who prepared them for the actual exam that they had entered and not just taught them irrelevant facts that he/she happened to know; one who showed how the whole subject fitted together so that they knew what, when, where and how to do things during the year that lay ahead of them. This type of information could easily have been discovered in a face-to-face class discussion but the major benefit of using Blackboard was that everyone in the class contributed (ie I was not only getting the opinions of those I chose or the most vocal) and the transcript of the chat enabled us to have a further discussion to clarify some of the issues.

I wear many different 'hats' in the Northern Ireland education system so, as well as being a teacher and one of the deputy Headmasters in the school, I attend various meetings, seminars and conferences. It was normal for me to be in the classroom some of the time and was elsewhere for most of it. Sometimes I was in school and my Systems Manager (who is a qualified teacher with a teaching load of 10% approximately) was with my class. At other times I could have been anywhere in the world. My students and I chatted synchronously and discussed many elements of the syllabus asynchronously either on Blackboard or by email. Some of my Masters colleagues, including John Anderson and Mary Mallon (whose Case Study is at the end of this chapter), joined me in the Virtual classroom from the comfort of their homes. We became a group of learners who used the Blackboard CMS as the main teaching resource. I provided them with hyperlinked notes, PowerPoint presentations, a web based Case Study for one of their assignments, a huge glossary of terms, exemplar materials, helpful and relevant external websites, key points and typical examination questions. I used a combination of the assessment tools in the BB Virtual Learning Environment (VLE) and the 'digital dropbox' for questions which required extended answers.

It really took a great deal of effort to set it all up and then there was the time factor for the pupils to take it all on board. I had realised the huge amount of time investment on

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my part but hadn't really appreciated how much longer it took to deal with each of the topics on the syllabus than would have been the case in 'chalk and talk' teaching. I soon realised that using technology in this way is more than just the provision of online materials. It is the level of interaction that really makes the difference. As someone said 'you can take a child to a computer but you can't make him/her learn'.

I capitalised on the novelty factor which the pupils were experiencing. In no other class had anyone ever bothered to take account of their individual learning styles nor had they planned out, and made available, the whole course on a week by week basis. We communicated a lot on Blackboard and by private email and saw each other occasionally face to face. All of the materials were online 24/7 but, while I made myself available for reasonable amounts of time, I had to draw the line on occasions. The pupils did spend much more time on topics than they normally would have done. At least I was now sure that more of them knew what I was talking about because of the amount of feedback I was receiving. I suppose that 'normal' lessons do have a certain amount of feedback but it tends to end and die at the end of the lesson. With online learning it continues well after the bell has rung.

My "unresearched and unvalidated" conclusions were that the workload for the teacher took two or three times as long. But, in the end, the learning was "better" and has more chance of becoming the foundation for lifelong learning. When I meet the pupils they still talk to me with affection about their unique experience. What they liked most was the "big picture" approach. They knew where everything was on the site and so it was easier for them to locate the materials even if they were off school or working from home in the evenings. They didn't mind investing their time in the extra communication with me. In fact, in some cases, many pupils have remarked to me how much they appreciated this almost individualised approach that they were receiving from me.

There were 22 pupils in the class. Fourteen of them got an A* grade, seven got an A grade, and one, who had a serious medical problem in his home, got a grade D--just to keep me humble! Normally less than 10% of the exam population in the British Isles would get a grade of A*.

I have secured a secondment from the classroom for a year with part of my brief being to finish the materials. I am now working with the local Examinations Board on an official research pilot to provide this course for all schools in Northern Ireland. Progress is slow because so many other equally valuable and worthwhile things about e-learning get in the way, but I will get there in the end and Northern Ireland will have its first online high currency course in time for the completion of the province-wide computer provision. I hope to begin research trials with over 100 pupils from 5 different schools and, from this, John and I will develop a methodology for teaching sixteen year old pupils in this way in our schools. We have realised that the use of a VLE in the classroom is different from that experienced by both students and tutors in Further or Higher education and have set about investigating these differences for both teachers and pupils. The findings and evaluations will be published later on our website at <http://www.elearningfutures.com>.

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Tools for e-Learning

The above e-Learning experience makes use of VLE, or Virtual Learning Environments, an umbrella term used in the United Kingdom for systems that support and deliver e-Learning. The specific tool, *BlackBoard*, is what provides the "core" for the learning exchange of data, understanding, and eventually knowledge.

As you might expect, new e-Learning tools are becoming available daily. These tools fall into five categories: computer applications, web-based integrated learning systems, web-based classroom applications, web-based school-wide CMS, and videoconferencing applications. We will highlight just a few tools in each category. A 6th category, the online "social network," is enormously popular with today's students and adults. Because of the dangers of an "unmanaged" and anonymous community, however, these services are not currently recommended for education (unless they are embedded in a educationally safe and secure service).

Computer applications Software installed on a laptop, desktop or handheld computing device can be used for e-Learning when it provides for communication, cooperation and/or collaboration over a network. Many of the productivity applications introduced in Chapters 5 and 6 can support e-Learning

- *Artemis*—This tool, for handhelds and desktops, provides tools for data analysis and collaboration. It begins with Driving Questions and insists upon accurate record-keeping. Users are able to connect to a set of web-based tools and information sources. A simpler tool is called *Model-It*. *Pico-Map* is a free tool for handhelds that creates interactive concept maps.
- *FirstClass*—Although this application is primarily an e-mail service, its ability to provide conference rooms and group calendars, serve web pages, record and transmit sound files, and chat make it a powerful tool for e-Learning. Users must have the "client"⁹ on their computers and have access to a central First Class server.
- *iChat*, *iChalk*—In the Apple environment, these tools provide powerful tools for communication and collaboration across a LAN or WAN.
- *MicroWorlds*—In its newest configuration, this Logo based tool enables students to create and manipulate simulated multimedia environments with the addition of global, interactive collaboration.
- *Squeak*—A tool developed for e-Learning in the k-12 environment. Squeak supports media elements, requires problem-solving, and can be used for P2P real-time collaboration via voice communication, chat, or file sharing.
- *Microsoft Exchange*—Once NetMeeting, Exchange provides web conferencing, video conferencing and IM capabilities to group. Additionally, the real-time sharing of some documents is supported.

⁹ the user's desktop, laptop or mobile device

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- *Skype* – a free application that enables users to make peer-to-peer voice over IP (VoIP) low cost phone calls to a cellular or landline phone used by another Skype user.
- *iVisit* supports text and videoconferencing across platforms and does not require that data be relayed through a server, making it useful in a non-networked classroom

Web-based Integrated Learning Systems (content providers)—The best of these provide tools for communication, cooperation, collaboration and publication in addition to content delivery and assessment tools

- *QuickMind* is a commercial e-classroom from Sunburst Learning Solutions, which also creates educational software.
- *Kidz Online*—This environment for e-Learning is dedicated to the development of 21st Century technology skills, including networking. It includes web site hosting, instruction through streaming video, and much more.

Web-based classroom applications—These can be used by a single teacher to create an e-Learning activity or an e-Classroom. Chapter 9 expands upon this list and discusses the WebQuest in some detail. Bernie Poole has developed a WebQuest which is designed to help teachers learn about “Weaving the Web into the K-12 Curriculum.” This resource may be accessed at <http://www.pitt.edu/~edindex/WebQuests>.

- *NiceNet*—The Internet Classroom Assistant allows registered teachers to create a **free** online classroom—ad free! This is perhaps the most powerful tool available to the teacher, for it allows for the creation of multiple and global "classrooms."
- *MemberClicks*—This web-based company creates and hosts interactive databases, data display and collection solutions. It is not inexpensive, however.
- *TrackStar*—Organize web links into lessons with this free tool. You can also search the large archive of completed lessons.
- *Yahoo Groups* and *Google Groups*—Teachers can easily create a short-term or year-long e-Learning group, complete with (limited) document sharing, chat, calendaring, and free e-mail.
- *BlogDrive.com*—This site provides free hosting for blogs, or web logs, which can become collaborative environments.
- *Wikispaces* – teachers can create a free and extensive classroom WIKI with an account at this service provider.

Web-based School-wide CMS These generally require a significant subscription expense. Some require in-house support as well. They do not supply content; they supply communication tools.

- *Think.com* was developed by the Oracle telecommunications program to support free e-Learning in the k-12 environment. Originally developed to provide free e-mail accounts to UK students, it grew into a full, web-based environment capable of delivering all of the components we have identified for e-Learning; it is being used throughout the UK.

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- *eClassroom*—A "turnkey¹⁰" solution for schools wishing to develop virtual classrooms (Distance Education) quickly.
- *Illuminate*—This new solution provides a "webcast" environment, including chat, virtual whiteboards, voice and webcam¹¹ support, file display. It is widely used in the global ICT community.
- *Adobe Macromedia Breeze*—An e-Learning environment developed for business but very useful for education. It includes web conferencing.
- *Moodle*—A cross platform "open source¹²" application for producing internet-based course content similar to that created by BlackBoard. This is superb, but it requires significant support from in-house IT personnel.
- *WebCT*—This is perhaps the most-used environment for universities, large schools and school districts. It has recently merged with *BlackBoard*.

Videoconferencing is a special type of e-Learning. It is integrated into several of the tools above. We are presenting it separately because it requires special hardware, a digital video camera and microphone. Video conferencing can be 1-way or 2-way.

A one-way conference is often used for Distance Learning: the camera records the teacher or presenter on one end. The students view the live video or archived video on a computer (or projected onto a screen) at the other end, and respond either via a realtime chat tool or an asynchronous tool (bulletin board, blog, etc.). Tutorial e-Learning uses the video format but does not require that students respond.

2-way videoconferencing requires that synchronized cameras and microphones be available at both ends (some conferences include multiple "nodes"). This is perhaps the most exciting of all e-Learning for the student. The setup can be as simple as inexpensive digital video cameras and microphones or as complex as studio conferencing with high-end equipment to support panning, delayed action and title effects. It is most effective if the connection speed is the same at both ends and the cameras have similar resolutions. A dial-up connection can not generally support effective conferencing—cable modem or DSL are minimally required. Studio conferencing requires at least a high-speed ISDN connection.

Most conferences are arranged by teacher-to-teacher or teacher-to-organization contact. This direct connection is recommended, for planning issues are numerous. Content, of course, is key—students generally do better in a videoconference if they have a knowledge base and a set of rehearsed questions. Time is an issue as well – consider both the length of the conference and the synchronization of clocks! It goes without saying that the teacher needs to do a "dry run," if possible, the same way she would visit a local museum before bringing her class there.

¹⁰ As its name suggests, a turnkey solution is "all in one, out of the box"—including software, a server (or remote installation on a school server), all files and modules

¹¹ Remember that a webcam is a portable digital video camera

¹² You may remember that "open source" software is developed by programmers and made available, generally over the Internet, for free

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Locating a video conferencing partner is not difficult. AT&T maintains a current directory of museums, schools, and other organizations that have video conferencing studios (<http://www.kn.pacbell.com/wired/vidconf/directory.cfm>) as well as links to other directories. Teachers that have access to similar studios¹³ can schedule programs the same way they would schedule field trips. In fact, these events are often referred to as Virtual Trips¹⁴.

Classroom-to-classroom video conferencing, over the available Internet connection, requires only that a teacher make a connection to another teacher. Using a tool such as iChat AV or Microsoft's integrated conferencing, students can easily "talk to" students, authors, or experts on the other side of the state, country or globe. e-Learning project registries such as that maintained by Global SchoolNet (<http://www.globalschoolnet.org/index.html>) will help a teacher locate other schools that have videoconferencing capabilities. There are numerous "video chat rooms" online, many of which provide free space and free software for users. Teachers must use these with caution, however, for the most prevalent users are NOT school classrooms.

At this point you may be feeling overwhelmed or frustrated by a lack of experience or access to tools. You may be thinking—e-Learning sounds great, but what do I use it FOR? It is appropriate at this time to take a breath and remember that the Internet is a huge resource. As e-Learning buzzes through the k-12 school community, it generates a plethora of excellent online projects, ready made and supported by an experienced teacher community. In the next section will we highlight a few of these, indicating the e-Learning modes that they demonstrate.

Model e-Learning Projects

Local, asynchronous, text mode, web-resource based—These are organizational and teacher websites and teacher-created activities. Many contain media elements, but most are text-based. Publicly posted, they are available to classrooms and teachers in a global community, although such access is generally "invisible" to the creator. Many contain a significant number of activities for students, which may include a WebQuest activity. These work well as collaborative or individualized e-Learning within the classroom.

- Learning Page from The Library of Congress – provides a growing collection of activities for collaborative learning in the classroom—
<http://memory.loc.gov/ammem/ndlpedu/features/index.html>
- Colonial Quilts (a Ribit inquiry)—short-term -
http://ribit.tielab.org/ribit_show.php?firstview=true&sign=&viewnumber=&resultsperpage=10&id=54
- Powerful Words – a webquest about the Wabanakis of Maine—
<http://www.leasttern.com/Wabanaki/PowerfulWords/>
- X-BLOCK provides training in online safety at many levels—<http://xblock.isafe.org/>

Global, asynchronous, data collection, web-based—Activities such as this invite global participation. It is up to the "in-house" classroom teacher to guide the learning experience.

¹³ Many universities, technical schools and district training centers have videoconferencing facilities.

¹⁴ You will learn in the next chapter that Virtual Trips can also be entirely Internet based.

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- Technospud Projects—organized by Jennifer Wagner—different projects across the school year, ranging from Oreos eating to FrootLoops math—short-term—
<http://www.technospudprojects.com/>
- Journey North—one of the longest standing projects, students follow the migration of the Monarch butterfly, sharing data from member schools—<http://www.learner.org/jnorth/>
- Human Rights 101 – portal to collaboration projects for high school students – civil rights themes—<http://www.thirteen.org/edonline/hr101/>

Global students, synchronous and asynchronous, data collection, web-based with hands-on or in-house elements Such e-Learning activities often require some teacher training or a small fee. They tend to be long term projects and often include multi-media elements.

- CIESE Online Classroom Projects—These cover many types of activity, from primary document exploration to data collection to collaboration—science topics -
<http://k12science.org/curricHOME.html>
- The Jason Project—multiple projects with an environmental focus—students engage in virtual science and collaborate with field scientists in remote locations—there is an option to bring a student group to the study site—<http://www.jasonproject.org/>
- The Globe Program—students and their teachers join a global community of scientists in environmental study—uses handheld devices—<http://www.globe.gov/fsl/welcome.html>
- Center for History and New Media – online tools free to educators, in addition to a vast resource bank—<http://chnm.gmu.edu/index.php>

Design Considerations for Effective e-Learning

e-Learning can be hard work, both for the student and the teacher, with Distance Learning being the hardest of all. Drop out rates in Distance Learning courses (as opposed to shorter term learning activities that use a Distance Learning model) are typically higher than for face-to-face courses. It takes a significant amount of time to create an effective web-based learning project, much less a WebQuest or Distance Learning course. Even the teacher who embraces one of the ready-made projects, such as those listed above, will find that the first implementation is time-consuming; few projects will dovetail neatly into a teacher's curriculum, methods and class profile.

The following are some of the considerations that the teacher should keep in mind when implementing or designing an e-Learning experience, event or course.

- Students need to be able to easily find all the information they need.
- Information at the site should be accessible to the student audience, appropriate in content and reading level, and meeting assistive requirements (if any). Where files or documents are uploaded or provided, they must be in a format that any user can read.
- Students need to find the online presentation of information attractive and accessible. It would be a waste of time to prepare an e-Learning project for a class of students who had no access to the Internet outside of the classroom or who lacked the funds to purchase software for home computers.

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- Students need to feel like they belong to a community. Belonging requires recognition (That's your work!), positive and supportive feedback (rules for contribution need to be established for younger students), and opportunities for casual communication or sharing.
- Students need to feel like they are connected to their instructor. Again, communication and feedback are essential!
- Assessment should be formal and at least equal in rigor to that expected in the face-to-face classroom. Many e-Learning projects lend themselves to authentic assessment as well as standard methods, but assessment tools (rubrics, checklists, corrected essays) need to be part of the design of the program, even if they only exist in-house and in-print. Furthermore, in the k-12 environment assessment should include "how the student managed" as well as how the student learned: collaboration and cooperation should be assessed.
- Students need to be directed to keep up with the course or to keep pace with the assignment, especially if collaboration and cooperation are keys to eventual completion.
- The Web is an invaluable tool and information resource and should be used whenever applicable as an extension to the content for the course. The Librarian should also be seen as an invaluable resource. He or she can provide not only resources, but Information Literacy lessons and support (this is the topic of the next section).
- Constructivist methods go hand-in-hand with technology and should be planned for in the design of the course. It is beyond the scope of this text to undertake a description of Constructivism in the classroom, so we will limit ourselves to what is becoming a cliché: The teacher must be a Guide on the Side, not a Sage on the Stage.

e-Learning is not a 21st Century miracle drug for education, nor is it a placebo. Potentially, it is both. For the time being, it is the teacher who will determine its value in the classroom. We end this section with a reiteration of David Thornburg's vision for the 21st Century that opened chapter 7: "Modern technologies are space collapsers, time shifters, and creative tools that extend our reach."

INFORMATION LITERACY AND INTERNET CONCERNS

Information Literacy, from the point of view of the educator, is the ability to recognize when information (our "data") is needed and then to have the ability to locate, evaluate, and effectively use this information in the learning process. For most of the history of education to date, this has meant being able to read, listen, write and speak effectively. With the advent of the Internet (and now Internet 2), a new e-Learning definition has come to the fore, a cause championed, and rightly so, by librarians. Information literacy, in the e-Learning environment, breaks down to three skills: searching the Internet, organizing and sharing data, and constructing learning based upon acquired information¹⁵. We will deal here only with the first of these skills. Applications and digital tools for organizing and sharing data have been

¹⁵ You are reminded that these are by no means the only skills necessary for the effective use of technology in the classroom! But they are a good start.

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discussed in previous chapters. It is beyond the scope of this text to dwell on the last skill, critical though it is. The American Library Association's Information Literacy resources provide further information at the following URL, which can be slow to download: http://www.ala.org/aaslTemplate.cfm?Section=Information_Power&Template=/ContentManagement/ContentDisplay.cfm&ContentID=19937.

Searching the Internet: Search engines

Internet¹⁶ "search engines" fall into three categories: spiders, directories, and database searches.

- *Spiders*, or crawlers, are robot programs that taste all accessible web sites and try to match your "keyword string" to their criteria. Google, AskJeeves, Hotbot, and Alltheweb are just a few of the spiders currently available. Each engine employs search strategies of its own. Some use a *breadth-first* approach, scanning across the higher-level web pages in a site first on the assumption that the most used sites are those most likely to yield the required information. Other engines use a *depth-first* search, drilling down the hierarchy of web pages in a site on the assumption that a website that yields interest from a dedicated base of users (a niche of users, if you like) will return a higher degree of *quality* information. Other engines will count as a *hit*¹⁷ any site where at least one of the search keys you listed is found and search for a hit count. An engine using this strategy will find more hits, but the majority of the hits may not be very useful at all. Most spiders will search META content¹⁸, headings, titles and full text.
- *Directories* are created by real people, who classify each web site into a pre-existing category or topic. The search is more like a traditional library catalog search than a keyword search; the path followed by the search engine is displayed, as are links backward to a more general topic (these are called *bread crumbs*). Examples of directory engines are Yahoo, About.com and the AOL search engine.
- *Database searches* are the most lucrative, often, but also the most frustrating. The Internet contains many databases that are, by the nature of their hosting or creation, "invisible" to spiders and directories. Many of these, such as *ProQuest*, a database of full-text newspaper and journal articles, and *SIRS*, a database of full text articles on a wide variety of cultural, health and political issues, are invisible because accessing them requires a secure (and often fee-based) password. Others, such as *ArtCyclopedia*, are invisible because their hosting system or content is not accessible to spiders. Luckily, search engines exist for the accessible. Google Scholar (<http://scholar.google.com/>) and Infomine (<http://infomine.ucr.edu/>) are two of them. Many of the fee-based databases are also available through school and public libraries. In fact, a teacher who knows about the locally available library resources can greatly enrich her students' e-Learning experiences.

¹⁶ As of this writing, it is unclear how effective any search engine is at searching the Internet 2.

¹⁷ A hit is a match—a search engine displays a list of sites, documents, images that match your search terms

¹⁸ META tags are "invisible content" added to the HTML of a web page by its author. These include keywords, authorship and a description.

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Search strategies

You should try more than one engine and more than one database when researching a topic, unless you are fortunate enough to find what you need first time. You should also try various words or sets of words as the key for your search, especially if your early attempts bring up too many hits to be able to check them all out individually. This is where search strategies come in handy.

The more precise you can make your search, the fewer hits you will find—which is often just what you want. For example, if you use a search engine to find material on a subject such as "London," you will find thousands, if not hundreds of thousands, of hits. Lots of sites will have references to somewhere as well known as London. In fact, if all you want to do is find out data in general about London, you'll be better off looking it up in your online encyclopedia. But supposing what you want to find out is the Aldwych Theater schedule. A better search string (set of keywords) would be "London Theater Aldwych." This will turn up many hits, too, but at least most of them will take you directly to the information you are looking for. Try it!

A good rule of thumb in searching is to start with a more detailed search string (that is, one made up of a few—two or three—key words, rather than just one). Then reduce the complexity of your search key until you start to find what you are looking for. It is quite likely that your critical thinking skills will also become honed by frequent research over the 'Net. This is because there is so much information on every subject under the sun that you have to become discriminating and selective to avoid becoming overwhelmed by it all. A Web page devoted to strategies for searching the Web may be found at <http://www.pitt.edu/~poole/strategies.html>. A good tutorial for teachers and students in need of keyword selection skills can be found at the 21st Century Information Fluency Project (<http://21cif.imsa.edu/tutorials/>).

In the end, as we have said over and over again, knowledge is power. The more you know about a subject, the easier it will be to find what you are looking for, no matter how much data are out there, just as the better you know the highways and byways of a town, the quicker you will arrive at your destination, no matter what the state of the traffic on the roads.

Behaving (Netiquette) on the Internet

It is not enough just to search and find. In our age of e-mail, blogs, podcasts, phlogs (photo blogs), bulletin boards, listservs, chat and IM, conventional requirements as to social behavior are as important on the Internet as they are in everyday polite society. Such conventions are called etiquette; on the Internet, pardon the pun, they are called *netiquette*. When your netiquette is lacking, you run the risk of being *flamed*—i.e. told off in no uncertain manner!

Table 8.1 lists some of the Dos and Don'ts of netiquette recommended by Vincent Zema (1996). Teachers, parents, and students know that there are "dangers" involved in Internet use. We will discuss in the next section some hardware and software tools for promoting safe Internet use.

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<ul style="list-style-type: none">• Don't include the entire contents of a previous mailing in your reply. Do leave in just enough to indicate what you're responding to. Never include mail headers, except maybe the "From:" line.• Don't reply to a point in a posting without quoting or paraphrasing what you are responding to, along with who said it. Otherwise other users may not know what you are talking about. Do quote briefly or paraphrase. If the original "Subject:" line was "Big dogs", make sure yours says "Re: Big dogs". Some REPLY functions do this automatically.• Don't send lines longer than 70 characters. This is a kindness to folks with terminal-based mail editors or newsreaders. Some mail gateways truncate extra characters, turning your deathless prose into gibberish. Do learn what your mail editor does with your text.• Don't SEND A MESSAGE IN ALL CAPS. CAPITALIZED MESSAGES ARE HARDER TO READ THAN LOWER CASE OR MIXED CASE. Do use normal capitalization. Separate your paragraphs with blank lines. Make your message inviting to your potential readers.• Don't betray confidences. It is all too easy to quote a personal letter in a posting to the entire group. Do read the "To:" and "Cc:" lines in your message before you send it. Are you SURE you want the mail to go there?• Don't make statements which can be interpreted as official positions of your organization or offers to do business. Saying: "Boy, I'd sure like to have one of them Cray supercomputers" could result in a truck at your loading dock and a bill in the mail even larger than your student loan. Do treat every post as though you were sending a copy to your boss, your minister, and your worst enemy.• Don't rely on the ability of your readers to tell the difference between serious statements and satire or sarcasm. It's hard to write funny. It's even harder to write satire. Do remember that no one can hear your tone of voice. Use emotions (or smilies) like :) or :^)—turn your head counterclockwise to see the smile. You can also use caps for emphasis or use 'Net conventions for italics and underlines, as in: You said the guitar solo on "Comfortably Numb" from Pink Floyd's <u>The Wall</u> was <i>*lame*</i>? Are you OUT OF YOUR MIND????!!• Don't make a posting that says nothing but "Me, too." This is most annoying when combined with the first or second of the Dos and Don'ts above. Do remember the immortal words of Martin Farquhar Tupper (1810-1889): "Well-timed silence hath more eloquence than speech."
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Table 8.1 Dos and Don'ts of Netiquette (Courtesy Vincent Zema)

Avatars Increasingly, e-Learning and other interactive virtual communities make it possible for users to "show themselves" graphically, often as an animal or caricature. Needless to say,

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avatar choice can result in some temptation to misbehave, especially when coupled with a suggestive "screen name." Remind yourself often than it is necessary for the teacher to *administer* the online world available to the students. This often means saying "No!"

The more you use the Internet, the more rules of the 'Net you will learn for yourself. A useful exercise, included in the Do Something About it section at the end of this chapter, might be to get together with some of your colleagues or classmates and brainstorm to come up with other Dos and Don'ts related to netiquette on the Internet. Be sure to include chat, bulletin boards, videoconferencing and IM's in your discussion.

Table 8.2 lists some "Tips for Going On-Line" from the *Interactive Services Association* of the *National Consumers League* (1996).

- **Be a little cautious.** You're not going to know as much as you'd like about those you meet on-line. Some may pretend to be people they're not.
- **Keep personal information private.** Don't give your address and phone number to strangers. Children should ALWAYS have their parents' permission before communicating personal information. If they are under 13, parent permission is law in the US. In public areas, like bulletin boards and chat rooms, literally thousands of people may read messages.
- **NEVER give out your password.** Be skeptical of people online who ask for your password. No online service will ask *its own members* for passwords online. Refuse such requests. It's also a good idea to change your password frequently.
- **Don't automatically believe everything you read.** Most people you talk to online will be sincere and readily offer information and advice, but that doesn't make them experts. Don't substitute a personal opinion for professional advice or assume it represents an endorsement by the online service.
- **Be courteous.** Other online users can't hear your tone of voice or see your expression. They know only what you type. For example, typing all capital letters is considered shouting, while typing :-D (a sideways face) means "I'm laughing." Other common abbreviations and "emoticons" are listed in Table 3.

Table 8.2 Tips for Going On-Line
(Courtesy Interactive Services Association, National Consumers League)

Filtering and other issues: Can We Control the Content of the Internet without Censorship?

Objectionable or inappropriate material abounds on the Web. What we're talking about here are sites devoted to pornography (however that may be defined), hate groups, extreme violence and other inappropriate subject matter whose content may be considered unsuitable for children at various stages of maturity. The following "solutions" to this problem are not ranked in any particular order. Each is important.

Solution #1: Acceptable Use Policies: An AUP is a policy that covers the responsible use of, uses of, and consequences of the misuse of all network tools: networked computers and other devices, Internet access, LANs, e-mail, listservs (in-house), etc. Schools may have several policies—for students in different divisions and for faculty. In light of our discussion of the

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importance of parent communication in Chapter 7, and for legal reasons, the AUP should be signed by a parent or guardian and by the student. Check out the Web links that follow to see some examples of both good and poor acceptable use policies. As Nancy Willard, Director of the Center for Safe and Responsible Internet Use observed, "Be sure to include due process information in your policy. This is something that is blatantly missing from most policies."

- At <http://www.aupaction.com/aupsonweb.html> you will find examples of AUP's from many school districts and schools.
- The NCES provides an overview of AUP use and content for schools (http://nces.ed.gov/pubs2003/secureweb/ch_3.asp).

Solution #2: Discuss these issues with the kids: Nancy Willard is among the most recognized spokespersons for responsible use of the Internet and has written a great deal on the subject. Her website at <http://responsiblenetizen.org> is dedicated to promoting the safe and responsible use of the Internet. Amongst her many recommendations is the importance of education, of making children aware of "effective strategies for acquiring knowledge, decision-making skills, motivation, and self-control to behave in a safe, responsible, and legal manner when using the Internet and other information technologies." Early in the year, teachers should talk with their students about the need for responsible use of the resources available through the Web. A good idea, perhaps, would be to have the students visit the [Internet Do's and Don'ts](#) website of the Computer Crime and Intellectual Property Section (CCIPS) of the Criminal Division of the U.S. Department of Justice. Talk about the need for responsible use of the resources available through the Web. Another good idea would be to visit Dewey's web site from the FTC (<http://www.ftc.gov/bcp/online/edcams/infosecurity>), from which you can access a quiz for students called "Are You a Safe Cyber Surfer?"

Solution #3: Be proactive (i.e. vigilant) as a teacher: Teachers are charged with maintaining a safe environment in their classrooms. Students (and their parents) expect the teacher to provide protection from exposure to danger of any kind. While the students are working online in a classroom/lab environment, the teacher should be alert and in a position always to know what the kids are up to at their stations. Students won't try to get away with things if they know they're likely to get caught! Vigilance can also involve occasional checks of the browser "History."

Solution #4: Filtering software and hardware: According to E-Rate Central's Weekly News for January 2001, "under a new federal law, included as part of a large spending package passed by Congress and signed by President Clinton in the closing days of 2000, schools and libraries will have to filter Internet access to be eligible for federal technology funding. "Any school or library that receives discounted rates for Internet-related services under the E-Rate program, or receives funding through LSTA or Title III, must adopt and implement an "Internet Safety Policy" incorporating a 'technology protection measure' that 'blocks or filters Internet access to visual depictions that are' obscene, child pornography, harmful to minors, or any other locally determined material 'inappropriate for minors.' The Policy must also deal with the safety and security of minors when using electronic mail, chat rooms, and other forms of direct electronic communications (i.e. Instant Message services), with 'hacking,' and with unauthorized disclosure, use, and dissemination of personal identification information regarding minors. Details of these requirements, and a timeframe

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for their implementation, are still unclear (and may be subject to various legal challenges)." This act, called CIPA (Children's Internet Protection Act) has, in fact, been challenged by the American Library Association, but the Supreme Court upheld its filtering requirements.

Most public schools therefore have some type of Internet access filter or control. There are several types of filtering, which can be done by in-house software, web-based access control, in-house hardware, or a combination of all three. Filtering itself can be based upon an "allowed list" of acceptable sites, domains, and services, or a "blocked list" of unacceptable sites, domains, and services. Even the least diligent filter will block many educationally useful sites (such as *breast* cancer research), and allow many unacceptable sites.

Check out the following links to see some examples of filtering software as well as filtering Web search tools.

The following are Safe Surfing Web browsers or search engines for kids:

- Altavista (<http://www.altavista.com>) and Google (<http://www.google.com>) contain "safe surfing" settings which are optional and which apply only if this search engine is used from this computer.
- AskJeeves for Kids (<http://www.ajkids.com>) is AskJeeves' neat, and safe, search tool for kids.
- Awesome Library for Kids (<http://www.awesomelibrary.org/student.html>)—this is controlled search directory.
- Crayon Crawler (<http://www.crayoncrawler.com>)—download a Web browser and use its secure list for a monthly fee. Read a company profile and find technical support.
- CSI SafeSites (<http://www.csisafesites.com/>) is a filtered directory search engine.
- Internet Safari (<http://www.internet-safari.com>)—offers a secure browser with animation and a jungle theme. Designed to filter sites and make the Web safe for surfing.
- KidsClick (<http://sunsite.berkeley.edu/KidsClick!/>)—directory searching of sites collected by librarians.
- KIDWEB (<http://www.email-connection.com/KWFINAL.html>)—showcases this animated browser that sets up an exclusive Internet neighborhood of pre-approved sites and provides secure e-mail—software must be installed on the computer.
- OneKey (<http://www.onekey.com/>)—a search engine to which you can point your students—in partnership with Google, it provides safe searching and an opportunity for you to recommend sites to add or remove.
- Yahoooligans (<http://www.yahoooligans.com>) is Yahoo's Web search guide for kids.

The following are software filters or filtering systems:

- Bascom Global Chalkboard (<http://www.bascom.com/>) is an example of an externally controlled searching option for schools—users attempting to use a browser are directed to Bascom's search portal.

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- Bess Internet Filtering (http://www.n2h2.com/products/bess_home.php) and Foolproof (<http://www.riverdeep.net/products/foolproof/security.jhtml>) will secure your network devices, and include firewalls—they contain hardware components, as does SonicWall (<http://www.sonicwall.com/>).
- Clean Surf (<http://www.cleansurf.com>)—family friendly Web filter. This installed software routes all Internet requests through a secure server that contains the database of blocked sites. It includes an e-mail filter.
- Net Nanny (<http://www.netnanny.com>) and Cyber Patrol (<http://www.cyberpatrol.com>) are workstation applications that work like Clean Surf—chat monitors can be purchased separately.
- WebWasher (http://www.webwasher.com/client/download/private_use/index.html) is a free application that needs to be installed on each computer or on the Internet server. It uses both negative lists and positive lists (that can be changed). It includes content filtering and privacy protection.

PICS: The Platform for Internet Content Selection

The fact is that the Internet in general, and the Web in particular, are more or less free of censorship. People can, within the confines of law¹⁹, distribute whatever they want in the way of text, still images, and video. The Internet is a global network. It spans national and international boundaries. Infringements of the laws of decency and proscribed speech in one part of the world may not be infringements in another. To put it bluntly, there is no way of controlling "unacceptable" material on the Internet without shutting down the Internet altogether (which some countries are attempting to do).

Developed under the umbrella of the W3C (World Wide Web Consortium), the Platform for Internet Content Selection (PICS) "is a cross-industry working group whose goal is to facilitate the development of technologies to give users of interactive media, such as the Internet, control over the kinds of material to which they and their children have access" (Miller, 1996). The ICRA (Internet Content Rating Association) is an international independent organization that facilitates the use of PICS standards, as well as ratings of other electronic media.

Control is very different from censorship. PICS is not a rating service, it is labeling protocol that allows rating services, such as the filtering products listed above and the ICRA, to share a common language for making rating judgments (most do not take advantage of this, employing human raters or robot scanners instead). The actual rating "label" is placed voluntarily in the code of website homepage by the content creator. Searches run through a PICS compliant filter, such as the AltaVista safe search and many web browser searches (with "safety" features turned on), access the URL, then check its ratings against their list. Some searches will therefore be slower.

Software systems such as CyberPatrol, or NetNanny do not use labeling systems that are common to the other systems, and they do not recognize labels used by those other systems. This means that they can each only monitor the content that has been labeled by their particular software. This is one reason for their failure to do a complete job.

¹⁹ Laws to protect children from pornography exist and are currently in a state of some flux.

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PICS advocates a flexible blocking approach which separates the selection software such as NetNanny, et al., from the rating services. In this way, the filter software developers need only make their software PICS-compatible, which means that the software would be able to read labels from any source (because the labels themselves will be PICS-compliant). By using the software, the user—parent, manager, administrator—will be able to apply ratings based on their specific needs to control the Internet content to which specific users would have access. In other words, a filter set for "extreme violence" would filter the same sites, images, sounds, etc. in all filter media. Websites that do not contain ratings (a way to avoid filters) can be filtered out.

Control of content is not a trivial matter for teachers in schools where the Internet is made available to the students. Open, uncontrolled access would quickly lead to abuse. On the other hand, filtering systems often hamper teachers, and students, from finding the best and most relevant information.

In the end, as has been reiterated elsewhere in this book, the teacher should always come bundled with the hardware and software systems. When the teacher stays close to the children with a view to ensuring that they make optimal use of the learning environment, few problems can arise. But in a litigious society, situations could too easily arise where children are unwittingly given access in school to content that would deeply offend many parents, let alone the children themselves. The wise teachers knows, and follows, the policies of the school district, adjusting projects and expectations to match limitations imposed for the sake of safety.

Plagiarism & Copyright violations

This is an enormous problem. Once they learn about command-copy, command-paste, students are quick to figure out that the Internet can save them an enormous amount of thinking and writing time. Not only do students freely copy text for reports and essays, they freely copy images. The doctrine of Fair Use allows students, and teachers, to use copyrighted materials (which would be everything created in the last 78 years or more!) for educational purposes, as long as citation is given correctly and content and use restraints are followed. As you are no doubt aware, a "special case" exists for P2P sharing of software, digital audio (mp3) and video files, where there is clear violation of copyright by the act of downloading.

Teachers must learn about Fair Use and copyright and teach students about it—as soon as students begin to use the Internet for academic purposes. You will hear this message throughout this text, and it will be explored in the next chapter in terms of multimedia, but you might at this time glance at the materials found at these resources:

- Purdue University has created a terrific guide for Avoiding Plagiarism (<http://owl.english.purdue.edu/owl/resource/589/01/>)
- TechLearning's Copyright Guidelines for Administrator's (<http://www.techlearning.com/copyrightguide/>) is also useful for teachers
- A Crash Course in Copyright (<http://www.utsystem.edu/OGC/IntellectualProperty/cprtindx.htm>) contains information on all aspects of copyright and Fair Use.

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The best way for a teacher to avoid student plagiarism is to create assignments that do not encourage it. Structuring such an assignment is not difficult, but it does require a shift in methodology. In general, it is most difficult to plagiarize when the assignment:

- has a creative, multimedia, or an authentic product;
- is largely done in class or has steps and elements that can be closely guided and frequently checked by the teacher;
- requires problem-solving or critical thinking;
- is collaborative or cooperative;
- follows a guided research model, such as The Big Six (<http://www.big6.com/>) ;
- is structured to insure that students will be able to *read and understand* the information they locate.

The best ally for the teacher in all aspects of Internet use is the school librarian, who has been trained in Information Literacy education. The second best allies are the network administrator (the IT guy) and the Principal, both of whom will have to be involved in cases of student abuse of the AUP.

Other problems with Internet use

COPPA (Children's Online Privacy Protection Act of 1998) requires that websites that are visited by children under the age of 13 post a privacy policy that details any personal information collected from those children. In addition, each must contain a way for parental consent to be collected before information can be collected from children. Information would include full names, school name and grade, e-mail addresses, address, and phone number. Basically, this means that if you teach children under 13, you should not allow them to complete online forms without first obtaining the required parent permission as specified by the site²⁰. If the site does not specify permission, you should not use it. An excellent and well-written guide to this and other child safety issues is available from CSRIUI (<http://csriu.org/onlinedocs/pdf/srui/sruilisting.html>).

Ensuring Privacy on the Internet PGP (Pretty Good Privacy) is recognized as the best example of encryption software for ensuring the privacy of personal files or e-mail. *Encryption* is the process whereby data are converted into meaningless symbols which can only be understood by some party who has the key to *decrypt* the message back to regular text. This party would, of course, be the person or persons to whom you would be sending the private message anyway. In other words, using PGP, you would set up the system so that the sender and receiver of the encrypted mailings shared each other's keys.

It is beyond the scope of this book to explain how to use the PGP system. The author has prepared a set of tutorials which help the user download a free copy of PGP along with directions on its use. The tutorials are available at <http://www.pitt.edu/~poole/PGPintro.htm>.

²⁰ As of this writing, there is an unresolved discussion of whether the role of teacher as "surrogate parent" allows for the teacher to give permission for the completion of forms used in the classroom.

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Cyberbullying According to www.cyberbully.org, "Cyberbullying is sending or posting harmful or cruel text or images using the Internet or other digital communication devices." [cyberbully.org](http://www.cyberbully.org) is devoted to mobilizing educators, parents, students, and others to combat online social cruelty. For more information, check out <http://www.cyberbullying.ca/> and <http://www.cyberbullying.us/>. [Read about](#) how schools and parents in Fort Myers and Cape Coral, Florida, are confronting the real dangers posed by cyberbullying in their midst.

Online predators Here's what [Donna Rice Hughes](#) has to say about this problem facing children today: "One of the attractions of the Internet is the anonymity of the user, and this is why it can be so dangerous. A child doesn't always know with whom he or she is interacting. Children may think they know, but unless it's a school friend or a relative, they really can't be sure. Often we think of pedophiles as having access to children out on the playground and other places, but because of the way the Internet works, children can actually be interacting on their home computers with adults who pretend to be children." Visit Donna's website at <http://www.protectkids.com/index.html> to learn more about this and other dangers faced by children online.

Cybercrime (<http://www.cybercrime.gov>)—Stalking, cyberbullying, child abusers who use chat rooms, threatening statements and harassment are all cybercrimes of various degrees of seriousness. The U.S. Department of Justice maintains a clearinghouse of cybercrime information and resources. You will find there legal and policy issues, the U.S. federal code as it relates to this subject, telephone numbers to report the different types of computer crimes, a section for kids, and more. The Internet—Know Before You Go (<http://www.cybercrime.gov/rules/kidinternet.htm>) is an excellent site to visit with students. Teachers wishing to know more about the serious, and growing, problem of cyberbullying should visit Nancy Willard's site, <http://cyberbully.org/>.

Viruses—Few of the software filtering solutions listed in this chapter will prevent student researchers from acquiring and spreading viruses. This is generally going to be through e-mail activities associated (one would hope) with e-Learning activities, but can also be by file sharing (including files brought to school on portable disks and disk drives). The worst-case scenario, one that happens not infrequently, is the destruction of files stored on the hard drive.

It is generally the responsibility of the IT department to make sure that there is a system-wide solution to preventing the spread of computer viruses. However, teachers with stand-alone or modem-connected computers in the classroom may need to install virus-protection/detection/repair software, sooner rather than later!²¹

Garbage—not objectionable material, just useless content, which leads to a whole lot of wasted time. Again we come back to the importance of the teacher – well-designed and well-planned e-Learning projects minimize the time wasted with (often very appealing) garbage.

²¹ Commonly used anti-virus applications are available from Symantic (<http://www.symantec.com/>) and Macafee (<http://www.mcafee.com/us>).

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SAVVY SEARCHING OF THE WEB

There's a rule of thumb which applies to many situations in life. 80% of people use only 20% of the skills they're capable of. This is probably true as regards searching the Web; most people do it on a haphazard basis.

To find out if you are amongst the 20% of skilled or savvy Web searchers, read the author's series of articles on this topic published on the Web at [EducationWorld.com](http://www.educationworld.com).

Poole, Bernard J, Cara Bafle. "*Searching with Savvy, Part 1: The Best Search Engines.*"
Published online at: http://www.educationworld.com/a_tech/tech/tech222.shtml

Poole, Bernard J. "*Searching with Savvy, Part 2: Web Search 101.*" Published online at:
http://www.educationworld.com/a_tech/tech/tech223.shtml

Poole, Bernard J. "*Searching with Savvy, Part 3: Time-saving Shortcuts and Strategies.*"
Published online at: http://www.educationworld.com/a_tech/tech/tech225.shtml

LOOKING BACK

This chapter has examined teaching from an almost futuristic perspective. It is true that there are some elementary and secondary schools where students are already routinely using communications media for distance learning. In the majority of schools, however, students are still barely communicating amongst each other, let alone between classes and between schools, across age groups and across cultures. But this is where education is headed as our world shrinks to village-like proportions and as online environments for learning are made available in the schools. The resources available on the World Wide Web are too rich to ignore, as are the opportunities for personal and intellectual growth to be gained from collaboration with other students in and out of the classroom. The hope is that the material in this chapter has encouraged you to learn more about distance learning and the Internet so that you will be able to make informed decisions about using these technologies in your future classrooms.

LOOKING FORWARD

It is fair to say that teachers today have much going for them. Teacher-pupil ratios are better than ever, education is beginning to be recognized for its central role in preparing children for the Information Society, and the very fabric of education is changing as technologies such as C&C take hold. Computers and related technologies are also transforming the traditional concept of multimedia. Teachers are beginning to have available to them a wide range of digital media tools for teaching. Given time and training, teachers will learn how to incorporate these new tools into the way they teach, and into the way students learn.

In the next chapter we will examine the Internet again, this time in terms of the riches it makes available to the teacher, and how best to use these riches to improve education. Chapter 10 will examine the concept of multimedia, along with the equipment that makes up a modern computer-based "smart classroom".

Chapter 8: Education On-line: Distance Learning and the Internet

READ ABOUT IT

Case Study

Smoky Hill High School and the Case of the Cyberdome

by Rich Maginn

Applied Technology/Computer Department Chairperson, Cherry Creek School District

Aurora, Colorado

I have had the pleasure of knowing Doug for the past three years. Remarkably, 1996 has been his first year in a traditional computer science class, a class in structured programming using C++.

Our acquaintance began early in Doug's sophomore year when I was working on the completion of our local area network. Smoky Hill adopted a student-centered support model for technology. We began with a cadre of Smoky Hill students who have learned the technology and techniques for maintaining our original 125 computers (now 300).

Doug is part of this wonderful group of student volunteers. He has helped teach in, and maintain the Science Resource Center since his sophomore year while acting as a friend, mentor, and technical support person for the entire science department and all their computers.

It is important to note that this was not done for credit or money, but out of a concern for supporting what Doug felt, through his experience and vision, would be in the best interest of the Smoky Hill community. In his volunteer role, Doug has been instrumental in modeling the standards and values in the use and support of the system that has made it a continuing success.

We currently maintain nearly 1000 email accounts for students with 75% participation by our 150+ faculty members. The high standards for use modeled in his leadership role are one of the major reasons for this success.

Doug became a system administrator of the student-run Smoky Hill Internet project in his junior year. This was done in an independent study class that I sponsor. His role of system administrator is a further extension of his leadership role. I have seen his qualities of leadership and citizenship grow well beyond the definition of simple technical support. He has helped define a culture that has balanced the knowledge of, and curiosity about technology against the issues of its use and the ethics that need to surround it.

He recently had to pursue supporting an awkward ethical dilemma where one of his classmates, a friend and fellow system administrator, had violated privileges in the use of the email system. He used his knowledge to produce evidence to show the improper behavior. His understanding of the higher ethical principles that define his role, responsibilities, and actions led to protecting another student's right to privacy as well as maintain the integrity of the roles and opportunities afforded to student administrators in the future.

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In early October of this year, I saw Doug bring a brilliant, detailed analysis to a discussion on Cyber Democracy at the Fifth Conference on Computer Ethics at the Brookings Institution. In a team setting, Doug wrote, guided, rehearsed, and presented with his team a detailed description of an Internet project called 'Under the Cyberdome.' He was a major contributor in writing this project over the summer of 1996. The project did an analysis of the November 1996 presidential, state, and local elections that can be accessed at the following web address: <https://mall.smoky.org/~utcd>.

Under close scrutiny from the conference participants, Doug demonstrated a mastery of content with thoughtful responses to questions posed by the attendees. His individual and team effort brought praise from all the participants regarding the content of their product on the Internet. His ability to respond extemporaneously to a very informed audience on the specific issues and details of the content and implications of the conference theme was remarkable.

It was interesting to note that when Lou Grossman, the featured keynote speaker and the past president of NBC News, was doing a summary of features of electronic democracy, he suggested that they could well be implemented along the lines of the Smoky Hill model. What better compliment to the students' hard work and energy and to Doug's role.

Doug brings an enthusiasm, professionalism and vigor to his academic, school, and personal interests. He is held in the highest respect by his peers and teachers. He relays a confidence and enthusiasm for learning and a high level of academic achievement that is

rare. We look forward to his future accomplishments in all his academic and civic endeavors.

Doug is but one of more than about 20 very energetic students who have made our system what it is today. Their activities include: regular update, testing, and backup of software; administration of the email system; assembly and installation of new equipment; ethernet wiring and testing; construction and maintenance of our web site at www.smoky.org; administration of the three vital Linux file servers that provide mail, DNS, Internet News, and other services; and the care and teaching of nearly 1200 users of the system.

A typical day's chores have been as lackluster as doing tape backups and adding new email accounts to the considerable challenge of bringing up the entire web site in less than two hours after the site was brought down by an individual who broke into our system.

Through the efforts of these students, hardware support has become seemingly invisible as other students author documents on the Internet; correspond via email to friends and family; create kiosks of their specialized interests from airplanes and cooking, to their favorite rock band. A teacher has gone on to create a nationally recognized web site that reflects the content of his Health curriculum.

In the early stages of this proposal, I was reminded that the one recurring resource in education is our students. In utilizing this resource at Smoky Hill, we have found that when students are given ownership of the tools, the opportunity to learn the accurate details of the issues surrounding the technology, and the expectation of the responsible use of these tools, they become a

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community of users who transcend the boundaries that we create through our perceptions and go on to surprise us with their creativity, energy, and love of learning.

TALK ABOUT IT

Topics for discussion based on the Case Study.

1. Generation Y is a highly successful professional development system developed in Oregon and now made available to schools throughout the country (<http://www.genyes.com>). Central to the program is the use of skills students to work with and train teachers. Discuss the advantages and disadvantages of students training students and students training teachers, as compared to using teachers as the "experts" in technology education.
2. If you work in a small district with limited integration of technology, how might you replicate the success of the Smoky Hill model?
3. What areas not mentioned in the Case Study would be appropriate for a school to explore in empowering students as centers of the learning process?
4. "Privacy is dead." In an age where each of us is increasingly dossierled and documented in electronic systems, how, if at all, can we protect our right to privacy (if we even have such a right)? Brainstorm ways in which you are electronically documented, and consider the use of electronic labels (such as PICS) as you answer this question.