THE POWER OF THE INTERNET FOR LEARNING

The power of the Internet for learning: Moving from promise to practice. Report of the web based Education Commission to the President and the Congress of the United States.

ABOUT THE REPORT
A bipartisan, Congressional Commission on Web-Based Education set out to discover how the Internet is being used to enhance learning. Their report was delivered to Congress in December 2000. This is a eighteen-page summary of that 168-page report.

Disclaimer: this abstract is not a product of the Commission. It was created for our own use, and at the request of friends who have expressed a desire to keep up with the latest research on web-based learning but lack the time to wade through hundreds of pages of source documents. If this abstracted version whets your curiosity, we urge you to read the entire report at http://www.webcommission.org/.

STATISTICS (as of Dec 2000)

INTERNET
- An estimated 377 million people worldwide use the Internet.
- Half of all Internet users are in the United States.

EDUCATION & TRAINING
- At $815 billion, education and training is the second largest sector of the US economy, second only to healthcare.
- The education market represents 9% of the US gross domestic product.

K12
- The K12 e-learning market is estimated at $1.3 billion. It is expected to grow to $6.9 billion in 2003.
- Public elementary and secondary school enrollment is projected to reach over 47 million students in 2000.
- There are 3 million teachers in K12 schools today.
- One third of K12 teachers have 20 years or more of teaching experience (and thus are close to retirement age), while 2/3 are in mid-career.
- K12 student populations are expected to grow by two million students by 2009.
- To meet rising enrollments and replace retiring teachers, schools will need to hire between 1.7 and 2.7 million additional teachers over the next decade. Additionally, an estimated $127 billion in spending is needed to repair, rebate, and modernize school buildings.
- The number of home-schooled children is growing dramatically. The estimated number of home-schooled children from 6-17 years old was 345,000 in 1994. It is now estimated to be between 700,00 to 1.5 million.
- We have an increasingly diverse student population. Thirty-five percent of U.S. children are members of minority groups, and that figure is expected to climb to more than 50% by 2040. Currently, one in five U.S. schoolchildren come from a household headed by an immigrant.
- Nearly one-fifth of U.S. schoolchildren live in poverty.

POSTSECONDARY

- The postsecondary online market is estimated at $1.2 billion. It is expected to grow to $7 billion by 2003.
- College enrollments are projected to hit a record 15 million in Fall 2000. Between 1998 and 2010, full-time enrollment is projected to increase 22% and part-time enrollment is projected to increase by 16%.
- About 67% of high school graduates now go directly onto college, far more than in previous generations.
- Fifty-eight of all postsecondary students own their own computer. This ranges from 79% for students at private universities, to 40% of those attending public two-year institutions and only 34% for those attending private two-year institutions.

TEACHERS & TECHNOLOGY

- Almost 2/3 of all teachers feel they are not at all prepared or only somewhat prepared to use technology in their teaching.
- Almost 2/3 of teachers (65%) had never used a computer before being introduced to one in the classroom.
- A survey by the National Education Association (NEA) found that while 94% of NEA members are able to surf the web, most do not know how to apply their web skills in classroom instruction.
- 70% of educators put professional development at the top of their list of technology challenges; it is viewed as the critical ingredient for effective use of technology in the classroom.

DISTANCE LEARNING

- Number of accredited courses offered on the web by US colleges and universities: 6000.
- Students enrolled in distance education (as a percentage of total post secondary enrollments) are projected to triple to almost 15% in 2002 from just 5% in 1998.
- The number of distance learning courses offered by post secondary institutions nearly doubled between 9994-95 and 1997-98. So did the number of enrollments in distance learning courses.

BUSINESS

- The US corporate e-learning market is estimated at $1.1 billion. it is expected to grow to $11.4 billion by 2003 (the global market is estimated to grow to $365 billion by 2003).
- Venture capital funding for "knowledge enterprises (e-learning) in January 1999 was over $3 billion---triple the total invested in the previous nine years.
- Estimated number of IT positions that went unfilled in 1999: 720,000.
- Projected number of new and replacement skilled information technology workers needed between 1998 and 2008: 2,000,000.
- Percentage of employee skills estimated to become outdated within three to five years: 50%.
- Amount that corporate training budgets have increased between 1994 and 1999: 23.5%.

COMPARISON STATISTICS

- U.S. households with Internet access as of December 1998: 26%.
- Percentage 1 & 1/2 years later in August 2000: 42%.

- Estimated average amount spent by US firms for technology and technological support per worker: $3500-$5500.
- Estimated average amount spent by US schools for technology and technological support per student: $200-300.

- Percentage of US jobs that were "skilled" jobs in 1950: 20%
- Now: 85%

- Estimated use of classrooms (as opposed to distance learning) for corporate training in 2000: 78%
- By the end of 2001: 64%.

- Estimated market for web-based corporate learning in 1998: $550 million.
- By 2003: $11.4 billion.

- Number of students enrolled in higher education in the United States: 15 million.
- Number of students enrolled in higher education outside the United States: 84 million.
- Projected global demand for U.S. higher education by 2025: 16 million students.

- Number of corporate universities in 1987: 400.
- Number in 2000: 1800 (at the current rate, the number of corporate universities will exceed the number of traditional universities by 2010).

- Percentage of all corporate and government training that occurs on paid time: 90%.
- Percentage of all teacher training that occurs on paid time: 39%.

- Percentage of paid time spent by Japanese teachers on professional development and collaboration: 40%.
- Percentage in the U.S.: 14%.

- U.S. market for prescription and nonprescription drugs: $77 billion
    - Percentage of revenue invested in research and development: 23%
- U.S. market for K12 education: $313 billion
    - Percentage invested in research: 0.1%

- Percentage of all college classes that used Internet resources in1996: 15%
- In 1999: 40%

- Percentage of college classes that had a class web page in 1996: 9%
- In 2000: 25%

- Percentage of college course that utilized email in 1995: 20%
- In 2000: 59%

- Percentage of college course that utilized web-based resources in 1995: 11%
- In 2000: 43%

- Percentage of four-year colleges who expected to offer distance learning courses in 1998: 62%
- In 2002: 84%

- Number of students who enrolled in distance learning courses in 1998: 710,000.
- Number expected to enroll in 2002: 2.2 million.

- Percentage of growth in students over age 40 from 1970 to 1993: 235%.
- Percentage of growth in traditional (18-34) college students during the same time period: 35%.

INTRODUCTION

At the dawn of a new millennium, education and training face challenges. In the K12 system, there are growing enrollments in already overcrowded schools, teacher shortages, and decaying buildings. On college campuses, there is an influx of older part-time students. Businesses bemoan the dearth of skilled workers.

The Internet can help by:

- Bringing learning to students instead of students to learning.
- Creating learning communities that defy constraints of time and distance.
- Providing access to knowledge that was once difficult to obtain.

The Internet "…enables education to occur in places where there is none, extends resources where there are few, expands the learning date, and opens the learning place. It connects people, communities, and gives teachers and students multiple paths for understanding".

The Internet shows particular promise in *three* areas:

1. Centering learning around the student instead of the classroom
2. Focusing on the strengths and needs of individual learners
3. Making lifelong learning a practical reality

Based on its research, the Commission believes that a national mobilization is necessary, similar to those spurred by the race to the moon, curing polio, and bringing electricity and phone service to the nation. The Commission makes a call to action in *seven* specific areas:

1. Making broadband access widely and equitably available and affordable for all learners.
2. Providing continuous and relevant training and support for educators and administrators.
3. Building a new research framework of how people learn in the Internet age.
4. Developing high quality online educational content.
5. Revising outdated regulations that impede innovation.
6. Protecting online learners and ensuring their privacy.
7. Increasing and sustaining funding for technology in education.

Good News

The good news is that the Internet is bringing us closer than we ever thought possible to making learning of all kinds---at all levels, anytime, anyplace, any pace---a practical reality for every man, woman, and child.

Bad News

The bad news is that millions of people still cannot access the Internet, and do not know how to find information or how to use it. Unless changes are made, these already-at-risk individuals will become even more marginal and result in a division between the "digital haves" and "digital have nots"..

MORATORIUM? NO!

A few groups, citing lack of evidence of the effectiveness of educational technology as well as its possible shortcomings, have called for a moratorium on the educational use of digital technologies and education. The Commission believes that this call, if heeded, would squander a momentous opportunity. Consider, for example, that it took years for technological investments in business to bear fruit in the form of today's huge gains in productivity.

In today's global market, standing still is not an option. The Internet is *not* a fad. Nor is it just another in the long line of promised technological "quick fixes" for education. The Internet is not a new form of television---it is *the beginning of a new way of learning*.

AGRARIAN AND INDUSTRIAL MODELS

Today's education was built on:

- An **agrarian** model that worked in the years when we were a nation of farmers.
- An **industrial** model that produced factory line classes, assembly line curriculum, and a view of teachers as forepersons.

Today, the Commission believes that a new model is needed to create the "knowledge workers" who will define the Information age.

DISTANCE LEARNING IN THE MILITARY

The US Army needs soldiers educated for high-tech war fighting on a network-centric battlefield. However, costs for university-based courses for soldiers are high, scheduling is difficult, and soldiers are a very mobile population.

In response, the U.S. Army plans to build the largest online educational portal in the world. The army's new "Army University Access Online" is a $600 million-dollar effort based on laptop computers and "anywhere, any time" learning.

TECHNOLOGY TRENDS

Six technology trends could be important to education over the next several years:

1. Greater **broadband access**
2. **Pervasive computing** using wireless technologies
3. **Digital convergence** that merges the capabilities of telephones, radio, television, and other interactive devices

4. The establishment of **technical standards** for content development and sharing (e.g., SCORM)
5. The emergence of **adaptive technology** that combines speech recognition, gesture recognition, text-to-speech conversion, language translation, and sensory immersion.
6. Dramatically **cheaper broadband services**.

BROADBAND

In order to have Internet education evolve from text-based learning to more interactive and multimedia forms of education, broadband access is necessary. However, the national average for households with broadband access is currently 11%, with broadband penetration being greater in central cities (12.2%) and urban areas (11.8%) than in rural areas (7.3%).

THE DIGITAL DIVIDE

- From December 1998 to August 2000 the gap in Internet access between black households and the national average grew from 15% to18%. Hispanics, the gap grew from 14% to18%.

- While about a third of the US population uses the Internet at home, only 19% of blacks and 16% of Hispanics do so.

- College students nationally are more than twice as likely to have access to a computer at school than their counterparts in private black colleges and universities.

- Nationwide, about 74% of faculty own a computer, as compared with only half of faculty at historically black colleges and universities.

- Historically-black colleges operate half the number of network servers as universities nationally, and 75% of their servers and other equipment are either obsolete or nearly obsolete.

- For households with incomes below $40,000, students are more likely to have Internet access at school (56%) than at home (31%).
- Access to the Internet in wealthy school classrooms almost doubles that of poor schools. Wealthy schools average seven students per computer, poor schools sixteen students per computer (the national average is nine to one).

DISABILITIES

- One in five Americans aged sixteen and over has a disability of some kind.

- Students with disabilities comprise 11% of K12 and 7% of beginning postsecondary students.

- Sixty percent of persons with a disability have never used a personal computer. In contrast, only 25% of persons without a disability have never used a personal computer.

Recommendations
For the disabled, the Committee recommends:

- **Multiple means of representation** (e.g., text, graphic, audio, animated)
- **Multiple means of expression** for the learner (e.g., writing, speaking, illustrating, drawing, and video making)
- **Multiple means of engagement** (to attract easily bored or distracted learners).

CASE STUDY: WIRING SCHOOLS

South Dakota has a sparse population and a large land mass. South Dakota's governor turned to an unusual source to wire the state's classrooms--- prison inmates. The state provided supervisors and materials, while the schools provided food and lodging for the inmates. The result: they received an estimated $100 million of work for $15 million + $17 million in donations.

However, infrastructure alone is not enough---training and incentives are also necessary. Therefore, 30% of South Dakota's K12 teachers received 200 hours of training, a $1000 stipend, and another thousand dollars to purchase software to use in their classrooms. Administrators

participated in two-week intensive workshops, and 17% of university faculty received three months of summer support to incorporate technology into their instructional programs.

CASE STUDY: THE SUPAI

Changes in government regulations mandating that teachers in every state obtain an associate degree in early childhood development (or a related field) by 2003 meant that the impoverished people of the Havasupai Indian Reservation in Arizona faced a cutoff in critical Head Start services. In response, they installed six satellite dishes and partnered with Northern Arizona University to have an early childhood education program beamed into their community.

WHY HAVEN'T K12 INVESTMENTS PAID OFF MORE?

Haven't we already spent money to train K12 teachers in classroom technology? Yes, but he reality is that the money spent on teacher training is just a fraction of what is needed. For example:

- In 1995, the office of Technology Assessment urged that schools devote at least **30%** of technology budgets to training and support, and recently revised that recommendation to upwards to **40%.**
- How much of the technology budget is actually spent on training and support? **17%.**

Another impediment is that the training that teachers *do* receive is usually "too little, too basic, and too generic". Put another way, most teacher computer training can be characterized as "basic and brief".

- Ninety-six percent of teachers reported that the most common training they received was over basic computer skills,
- For most teachers, computer training lasted only one to five hours.

In business, companies pay for nearly all training. However, according to www.onlinelearning.net, an online continuing education provider, over 6000 teachers have enrolled in the company's continuing education courses. Of these, 85% of the teachers paid the $450.00 tuition fee *on their own*.

According to teachers, the top three barriers to the use of computers and the Internet in classrooms are:

- Lack of release time.
- Lack of time in the schedule for students to use computers in class.
- Too few computers.

Technology Environment

- A recent national study found that only 13% of the nation's teachers work in what can be defined as a "high quality technology-supported environment".

- Fewer than 20% of all schools have a full-time technology coordinator.

SUPPORT

In addition to training, support is also a problem. A study showed that it takes from fourteen hours to more than seven days to fix a technology problem in a school or classroom, with the average being two days. Such a lag would be unthinkable in most businesses.

TEACHER TRAINING

Teacher education programs tend to be profit centers for colleges and universities because:

- They have strong and steady enrollments.

- They are spared some of the expenses associated with other professional programs (e.g., equipping science laboratories).

Therefore, we might expect colleges of education to provide high-tech teaching laboratories. However, this is rarely the case. Why? Perhaps this is because teacher education programs tend to receive less attention than higher status professional programs, or because they have a less affluent alumni base.

Thankfully, this situation is beginning to change. Forty-two states now require teachers to demonstrate proficiency in technology as one component for receiving certification, and the National Council for Accreditation of Teacher Education (the nation's largest accreditation agency) has made technology an area of accreditation focus. Additionally, the Higher Education Act amendments passed by Congress and signed into law in 1998 provide a gateway for technology integration in college teacher education programs.

CASE STUDY: COMBATING ISOLATION

Under normal school conditions, a K12 teacher could go for weeks or even months without *any* contact with another teacher in their discipline (no wonder so many teachers feel professionally isolated!). In Indiana, the Inquiry Learning Forum (ILF) seeks to allow over 400 teachers who are interested in "inquiry based" learning to "virtually visit" other classrooms across Indiana as well as access a large video library of classroom episodes. The system is organized around several "virtual spaces": an office, workgroup, lounge, auditorium, library, and "my desk".

CASE STUDY: ELECTRIC SOUP

This online magazine is a showcase for student work it includes writings, RealAudio of original poetry, a virtual gallery, an interview section, and a section for alumni.

EDUCATIONAL RESEARCH

Educational research suffers from *three major problems*:

1. Lack of funding.
2. Educational research often does not support enhanced learning performance.
3. Educational research often is not accessible to teachers or easily translated into practice.

In a 1997 report, the Panel On Educational Technology of the President's Committee of Advisors on Science and Technology recommended that "the federal government initiate a large scale program of rigorous empirical research aimed at improving both the effectiveness and cost-effectiveness of elementary and secondary education in the United States…at a level equal to at least 0.5% of the nation's aggregate K12 educational spending, or approximately $1.5 billion per year at present expenditure levels."

However, we are a long way from this goal. Current best estimates of spending for educational research are in the $600 million dollar range.

ENHANCED LEARNING PERFORMANCE

We *have* made some progress in research. We now know that learning environments should be centered around:

- Knowledge
- Learners
- Social interactions
- Assessment

Instead, learning environments and school often:

- Focus on facts rather than knowledge.
- Are organized around teachers' lectures or texts rather than the needs of individual learners.
- Limit social interaction, encouraging solo study rather than collaboration.
- Allow current assessment methods to influence instruction.

ASSESSMENT

Perhaps the greatest barrier to innovative teaching is assessment based on outdated learning goals:

- "Too often today's tests measure yesterday skills with yesterday's testing technologies".

- "If we are to required to assess educational quality and learning by virtue of how long the student sets in a seat, we have focused on the wrong end of the student." p.91

Innovations

There have been recent innovations in testing: e.g., *computer adaptive testing*, where the test adapts to the test-taker's performance (the GRE and MCATs are now given in this format). Another is the advent of *web-based test administration*, where a central server contains an item bank, students take the tests from classrooms or computer labs, scoring is immediate, and teachers and administrators have access to a wide variety of reports on student performance.

These innovative forms of testing result in:

- Time and cost savings in test administration and scoring
- Better monitoring of achievement
- Better security
- Craters score precision
- Greater opportunity to evaluate progress over time
- Greater opportunity to enable teachers to adapt instruction in response to performance.
- Abilities for new types of questions (e.g., multimedia)

CREATING EDUCATIONAL RESEARCH THAT TEACHERS WILL VALUE

Too much educational research has been viewed as esoteric, faddish, or artificial. as a result, it is little used. We need a new type of research on education:

- One that is **mission-oriented** and combines basic and applied research
- One that is **integrated**, drawing from neurocognition as well as both behavioral and biological sciences.
- One that is **team-based** and draws up on the expertise of content experts, teachers, instructional designers, and technology developers.

STUDENTS WITH DISABILITIES

- "No group has more likely to benefit from web based education that people with disabilities".

People with disabilities need *access*. Techniques and technologies already exist to grant such accessibility. What is missing is public awareness of the standards as well as policies to ensure that they are followed.

A good example of design for access is the "Physics Interactive Video Tutor" (PiVoT) created by MIT. It offers better design and layout, access to tables, accessed to math equations, and access to multimedia.

E-LEARNING: THE MEDICAL MODEL

Recently, six patients in three countries underwent heart surgery simultaneously. Satellite connections allowed surgeons in each location to interact with 7000 cardiologists who were attending a medical conference. Doctors at the conference used response keypads to vote on issues in real time, the heart surgeons had access to this feedback while they were operating, and the entire experience engendered an intense intellectual dialogue on best practices.

EDUCATIONAL TECHNOLOGY

Total U.S. spending each year on textbooks and instructional technology content (software and online course materials) is $4 billion dollars.

However, only a handful of providers succeed in the online education content market. This is because:

- The market is highly fragmented
- Demand for many topics is limited.
- Cost to compete is high.

The result is that:

- There are areas where online content is of limited quality or quantity.
- Most instructional technology content takes little advantage of techniques like inquiry learning, project based activities, or collaborative learning.
- Much of this content fails to address the interests and needs of cultural or ethnic groups.

CASE STUDY: THE MASSACHUSETTS VIRTUAL EDUCATION SPACE (VES)

The VES aims to provide every K12 student, teacher, and parent in Massachusetts with a personal "workspace". This workspace will provide students with access to assignments, content linked to learning objectives, and portfolios. Teachers will be able to access curriculum standards, content databases, lesson plans, and tools for collaboration, planning, administration, and assessment. Parents will be able to access their children's assignments, portfolio, and teacher evaluations of progress. Washington State is partnering with Massachusetts to develop its own version of this program called WAVES.

CASE STUDY: THE VIRTUAL HIGH SCHOOL (VHS) PROJECT

The Virtual High School currently offers over 156 courses to about 250 schools in 32 states and thirteen countries. Tuition fees can be waived if the school creates an online course or facilitates a section of an existing course.

HOW FACULTY USE ONLINE RESOURCES IN THEIR CLASSES

- To make readings, original sources, or specialized materials accessible to students.
- To encourage out of class reflection at interaction (both student-student and instructor-student).
- To meet the increasing expectations of students that classes will be augmented with online material or discussions.

FACULTY NEEDS

Faculty in higher education are concerned about finding the best ways to integrate technology into their classrooms. However, they need:

- To become comfortable in using available communications technologies.
- Assistance in designing courses that take full advantage of these new media.

ONLINE TAKES LONGER
Creating courses for online delivery takes much longer than traditional classes:

- Estimates range from 66% longer all the way to 500% longer.
- Likewise, costs are widely variable.

Undertaking online classes involves a new set of risks as well:

- Teachers who experiment with new approaches may receive negative course evaluations
- Online teaching may not count as a tenure-enhancing activity, or may even be viewed as a distraction from traditional tenure-enhancing activities.

CASE STUDY: MERLOT
Rather than "reinventing the wheel", some higher education institutions are banding together to form collaborative groups. One example is the Multimedia Educational Resource For Learning An Online Teaching (MERLOT). Teaching resources are submitted by educators and peer reviewed before being posted in an online repository.

ASSURING HIGH QUALITY AT THE POSTSECONDARY LEVEL
Accreditation agencies should:

- Determine whether new Accreditation Review standards and practices are needed.
- Develop new tools where appropriate.
- Provide assistance to institutions, programs, and providers to develop internal quality review procedures for web-based learning.
- Explore whether existing accrediting agencies should expand to include for-profit institutions.
- Strengthen coordination among accreditors to respond to web-based learning with agreed-upon standards.
- Create partnerships for review of web-based learning

TWO MAJOR CONCERNS:

- Existing quality assurance usually measures educational *inputs* rather than student *outcomes*.
- There is confusion over what constitutes "accreditation" from "legitimate" agencies.

THE BOTTOM LINE: DOES DISTANCE LEARNING WORK?
Yes. a recent review says that distance learning courses compare favorably with traditional classroom instruction and enjoy high student satisfaction. Students in distance learning courses:

- Perform as well as students in traditional classrooms
- Earn similar grades and test scores
- Display the same attitudes toward the course.

However, note that the research base for the effectiveness of distance learning is limited and has shortcomings in both scope and methodology.

A recent report by the Institute for Higher Education Policy, in conjunction with Blackboard, Inc., identified 24 benchmarks necessary to ensure quality and Internet based distance education

CASE STUDY: NACTEL
Years ago, the Sloan Foundation recognized that the telecommunications industry was an obvious candidate for web-based learning. Therefore, in 1998 they funded the National Coalition for Telecommunications Education And Learning (NACTEL). NACTEL strives to

reach people who normally do not have access to education, offering a two-year Associate's degree in Applied Information Technology Telecommunications.

Approximately 2000 learners have taken classes so far, course completion rates are over 80% (similar to those for traditional campus classes), and learner satisfaction is high. This program's organizers believe that this online learning model may prove to have as much potential for work force learning as for traditional degree programs.

THREE BARRIERS

Pam Tate, president of the Center for Adult and Experiential Learning, says that the biggest barriers to adult learning are:

- Money
- Time
- Fear

REMOVING REGULATORY RESTRICTIONS TO E-LEARNING

The regulations that govern much of education today are focused on supporting educational *institutions* rather than *learners*.

These regulations are the product of an earlier "factory" model of education, where the teacher is the center of all instruction and all learners must advance at the same rate. Funding is based on "seat time" and the physical facilities that house educational programs. Therefore, funding is *time-fixed* and *place-fixed*. If not changed, yesterday's regulations will inhibit new learning opportunities for a generation of students.

These regulations and requirements do not match today's realities. Why? Because only 16% of today's college students meet the old stereotype of attending full-time, enrolling immediately after high school, and living on campus.

Problems:

- Credit policies that make it difficult to transfer credits across district and state lines
- Different curriculum standards from one state to another.
- An inability to redirect resources to support distance learning.
- Inadequate funding to support online learning.
- A need to reform state licensing and approval processes to better access the educational value of content and courses available online.
- Attendance policies that use the number of hours and days in the classroom to define achievement.
- Teachers are vacation policies that prohibit transfer of credentials from state to state.
- Teacher-student ratio requirements that do not take into account the requirements of web-based learning.
- Staff compensation focused around ten-month agrarian-model contracts.
- Accounting procedures that restrict the use of funding to support web-based instruction.
- In-state vs. out-of-state tuition rates vary widely and were designed for campus-based students.

Consequences:

- It can be impossible or impractical to create and adjust web-based programs that meet varying state requirements.
- Programs may be forced to meet the lowest common denominator to achieve homogeneity requirements.

- Institutions in one state may refuse to accept credentials awarded by institutions in other states.
- Student aid for students involved in technology-mediated learning may be limited.

THE TWELVE-HOUR AND FITY PERCENT RULES

When Congress amended the higher Education Act in 1992, it defined an academic year as involving at least 30 weeks of instructional time. Full-time undergraduates are expected to complete at least 24 semester hours (900 clock hours) in that time in order to be eligible for the maximum amount of federal aid under the title IV program.

Additionally, a week of instructional time was defined as "…twelve hours of regularly scheduled instruction, examinations, or preparation for examination for programs that are not offered during standard terms".

The 50% rule requires Title IV-eligible institutions to offer at least 50% of their instruction in a classroom-based environment. This provision was originally enacted to address concerns about fraud and abuse within the correspondence school industry.

Increasingly, colleges and universities have called for the elimination of these rules or at least a moratorium on their enforcement, arguing that these rules do not make sense in light of the growth of distance education and the growing use of the Internet for delivery of instruction.

However, the US Department of education's position is that eliminating these rules would leave the door wide open for abuse---and unfortunately, past abuses suggest that they may be correct in this assumption.

The University of Phoenix, among the nation's oldest distance learning institutions, makes the following suggestions:

- Rely on accrediting bodies to make the terminations about a quality of online distance learning programs.
- Hold distance learning programs to the same set of standards that are expected in a face-to-face instruction--- no less, no more.
- Re-evaluate the criteria for accreditation, making them less input based and more focused on student learning outcomes.

BAN ON INCENTIVE COMPENSATION PLANS

In 1992, Congress prohibited colleges and universities who receive student financial aid from paying any commission, bonus, or other incentive payments to third parties based on their success in helping secure student enrollments. This provision was enacted to protect students against abusive recruiting tactics.

However, the law is now being interpreted as applied to the enrollments of students via "web portals". An unfortunate and unintended side effect is that institutions who build their own portal system are immune to the regulation, while institutions that contract with a vendor to build the portal fall under its jurisdiction.

COPYRIGHT PROTECTION

The Copyright Act of 1976 established principles that allow researchers, students, and the public "fair use" to reproduce copyrighted materials under certain circumstances.

However, current copyright law governing distance education is over 20 years old and was based on broadcast models of tell courses for distance education. Professors complained about being forced to obtain licenses to use works over the Internet---the very same works they use in a physical classroom without requiring a license. They argue that the current copyright system threatens the element of spontaneity from online instruction that is afforded in the traditional classroom, causes course developers to compromise their content, into tours educators from entering distance education.

In the Digital Millennium Copyright Act of 1998, Congress requested the U.S. Copyright Office to study the impact the copyright laws might have on online education. The copyright office presented its report in 1999. In the report, they recommended clarifying the meaning of the word "transmission" to include digital as well as analog transmission, as well as eliminating the requirement of a physical classroom. However, these are recommendations, not laws.

Educators and librarians maintain that for web-based education to achieve its potential, an Internet "classroom" should be viewed as equivalent to a physical classroom. They seek the ability to use copyrighted works in a digital environment comparable to what the law currently allows in a face-to-face classroom.

However, proposals to man the copyright act and update fair use provisions are opposed by publishers, who maintain that the risks of abuse are greater in an online environment than any physical classroom. They decry the lack of technological safeguards that would protect online works from piracy, and stress that without these safeguards content creators may not be appropriately compensated for their creativity.

It may be useful to keep in mind that copyrights were not originally established to reward authors, but rather to advance science and art. "The primary objective of copyright is not to reward the labor of authors, but to promote the progress of science and useful arts. To this end, copyright assures authors the right to their original expression, but encourages others to build freely on the ideas and information conveyed by a work. This result is neither unfair nor unfortunate. It is the means by which copyright advances the progress of science and art." p.94

CASE STUDIES: UNEXT, CONCORD, ONLINELEARNING.NET, & THE UNIVERSITY OF PHOENIX

- Founded in 1997,UNext and Cardean university have established a consortium of elite academic institutions (e.g., Columbia, Stanford) that focuses on "enhanced learning"--i.e, a learning platform that combines the advantages of a traditional classroom setting with the flexibility and responsiveness of online learning. Curriculum and textbooks are the same as those at campuses nationwide. However, students can access "a personal homepages" which provide access to syllabi and the course's lectures.

- The Concord University School of Law provides legal education to people unable to attend a fixed facility program. Results show that Concord law students sitting for the first-year Law Student Examination in California had first time passed rates ranging from 20-33% higher than the state average and 80% higher than students from other ABA-approved programs.

- Onlinelearning.net is one of the largest virtual universities in the United States. They partner with universities, helping them produce and market accredited courses and programs to working professionals. More than 90% of students enrolled in courses

complete them, with 85% rating the courses as "as good or better than face-to-face learning".

- The University of Phoenix online program was started in 1989. It currently offers ten accredited degree programs to over 15,000 students via 1200 faculty members. The University of Phoenix's online campus program has routinely grown at over 50% per year.

PRIVACY, PROTECTION AND "SAFE STREETS"
Online advertising supports much of the "free" content on the web. Some schools see this as a tradeoff for high quality online content, while others view it as corporate exploitation.

There is currently little consensus regarding the role that businesses (and the attendant advertising) should play in education. While some schools have allowed companies to equip entire computer laboratories in exchange for advertising that appears when the Internet is accessed from these facilities, other schools have gone in the opposite direction and banned advertising altogether.

ONLINE PROFILING
Online profiling refers to the collection of information from and about a person as he or she surfs the Internet. Many consumers are unaware that online profiling is taking place (e.g., only 40% of web surfers have heard of web "cookies", a common method for profiling). There is increasing concern that students, and especially young children, should be protected from divulging personal information online.

YOUNG PEOPLE AND THE "DARK STREETS"
Even more alarming is the threat of exposing children to violence, pornography, and predators on the web. A national sample of youths from 10-17 found that 20% had been sexually solicited via the Internet. This amounts to several million young people being sexually propositioned on the Internet every year.

Pornography is also widely available on the Internet. Studies show that one in four youths had at least one unwanted exposure to nude pictures on the Internet.

However, to put these statistics about the Internet in perspective, note that 30% of youths had been attacked in *real life* by other youths during the past year. Also, regarding the alarming statistic on sexual solicitation, many of these solicitations are from other youths rather than from adults. On the whole, child victimization on the Internet is dwarfed by what children and youths experience in the real world. Still, we must take steps to minimize victimization of children and youths wherever it occurs.

POTENTIAL SOLUTIONS
One response has been **legislation**. The Children's Online Privacy Protection Act (COPPA) of 2000 regulates the collection of personal information from children under the age of thirteen, requiring web sites targeted at children to secure parental permission before collecting, using, or disclosing personal information from children. It also require web sites to post privacy policies.

However, COPPA does not cover teens, the law may unduly restrict children's access to valuable educational resources, its record keeping requirements are burdensome, and such legislation may have a dampening effect on innovative uses of the Internet for education and assessment.

Another response has been **filtering** or blocking software ("firewalls"). However, filters are not foolproof. On the one hand, unwanted material gets through. On the other, valid material may be screened out inappropriately.

Still another responses have been:

- **Monitoring** software that provides a record of the sites a person has visited on the Internet.
- Content **Ratings Systems**.
- **Portals** that serve as gateways to pre-selected and pre-screened material.
- **Acceptable use policies**.

FUNDING FOR E-LEARNING: A CONTINUING CHALLENGE

Purchasing computers is somewhat like purchasing school buses: after the initial purchase, they require fuel, maintenance, training for operators, space to house them, insurance, and upgrades.

Too often educational institutions focus on startup costs without planning for the substantial and continuing costs of operation. Without upkeep, equipment breaks or becomes outdated and is relegated to the "garage".

The business community uses "total cost of ownership" (TCO) models. At last, schools and colleges are also beginning to adopt these models.

LOCAL BUDGETS VARY BUT PATTERNS ARE CONSISTENT

A 1998 survey of large urban school districts found that technology budgets ranged from $22 per student to $584 per student, with the average being $120-130 per student.

However, at least in K12, technology expenditures are heavily on the side of *hardware*, with only 6% devoted to training, 6% to service and support, 5% to supplies, and 1% to online services.

It seems clear that schools are *under-investing* in the personnel and support needed to make their hardware investments most useful. In schools' defense, this is often a result of the way technology is funded in schools and colleges, making bond issues and grants for initial costs far easier to obtain than continued operating funds.

PATTERNS OF EDUCATION FUNDING FOR K12 SCHOOLS:

06% Federal
44% State
40% Local
10% Foundations

100% Total

THE FEDERAL GOVERMENT

The federal government's share of educational funding has declined from 14% in 1980 to 6% in 1998 (this is also true for higher education, down from 18% in 1980 to 12% in 1998).

However, there are areas where federal dollars have a major impact:

- The federal share of technology investment in K12 schools is from 20-35% of all elementary and secondary technology outlays.

- The federal government offers many specialized technology programs such as Preparing Tomorrow's Teachers To Use Technology (PT3).
- Other support comes from core federal programs such as Title I, Title II, Title VI, the Goals 2000 Educate America Act, and vocational and adult education funds.

TELECOMMUNICATIONS FUNDING: INTERSECTING STATE AND FEDERAL RESPONSIBILITY

Enacted as part of the telecommunications act of 1996, the e-rate program provides discounts on the costs of networking and telecommunications services to public and private schools, libraries, and educational consortia.

In the program's first two years, educational institutions received a total of $3.66 billion in discounts. The third year of the program is slated to result in discounts of $2.25 billion dollars.

QUOTES

- "Old models do not meet new realities. It makes little sense to use 30-year bonds to purchase equipment that should be replaced in three years."

- "The U.S. classroom is a 150 year-old, relatively low-cost technology, worn out by time and changed conditions for meeting these requirements."

- "We do not suggest replacing the classroom teacher with technology. However, we should consider how we could do more with the teachers we have".

NEED FOR NEW FUNDING MODELS

New funding models are needed. For example:

- Tax incentives
- User taxes on corporate technology purchases
- High-tech centers that an entire community can use after school hours (supported by user fees)
- Increased federal and state appropriations
- A learning technology trust fund

GOOD EDUCATION IS GOOD BUSINESS

Because business depends upon our schools' graduates, the committee feels that businesses should play a much larger role in helping schools make technology support their educational needs.

AGGREGATING THE E-LEARNING MARKET

Costs of educational technology could be driven down in several ways:

- Aggregated purchasing would enable suppliers to lower prices.
- The development of standardized education technology packages that are modular and scalable would also reduce costs.
- Integrating hardware, software, and services into packages takes much of the complexity out of planning and installing equipment.
- The use of accepted Internet standards and protocols would save costs and increased market demand.
- Development of inefficient network architecture could help with economies of scale.

CASE STUDY: ESTRELLA

The ESTRELLA program was created to serve children of migrant worker families. It recognizes the economic reality that migrant worker children must work to contribute to their families and seeks to unite the Internet, teachers, parents, and children ("The purpose is to get kids graduated"). Selected families receive laptop computers, Internet connections, and email accounts.

CONCLUSION

MOVING FROM PROMISE TO PRACTICE: A CALL TO ACTION

In conclusion, we should work to assure:

- **Universal broadband access** at all, at school, and at work
- High quality, on-demand, a continuous **professional development and support** for educators and administrators
- A **new education research agenda** that is well-funded and focused on how people learn via technology
- Online educational **content that is available, affordable, and excellent**.
- **Relief from regulations** and requirements that do not support innovations in learning
- **Reliable safeguards** to protect online learners and ensure their privacy
- **Sustained funding** via of both traditional and new sources.