E-LEARNING:

CURRENT STATUS AND INTERNATIONAL EXPERIENCE

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OVERVIEW OF E-LEARNING

A rapidly growing number of organizations worldwide are now delivering training and education over the Internet. There are an estimated ten-million courses now online, and the U.S alone reports about 700 e-learning companies. In addition to college and university courses and degree programs, some e-learning companies or institutions offer online tutoring to students at specific grade levels, ranging from primary through university; others offer courses only for corporations; some offer courses for individuals in career development and/or personal development; and many offer training in various management, finance and IT-related skills. Increasingly, training and support for teachers is occurring online, and a number of institutions now offer either partial or complete secondary diplomas through e-learning.

For example, the Massachusetts Institute of Technology (MIT) recently announced that learning materials and syllabi for all courses were being put on the Internet for anyone to use, although students must be enrolled in the institution to obtain course credit. The MIT administration and faculty made this decision because they determined that knowledge is for sharing and the Internet is the most efficient transmitter of knowledge ever available. The Virtual University in Monterrey is providing a year-long course for 25,000 inservice teachers through either satellite television or the Internet, and has been delivering online courses in business, finance and information technology since 1989. The United States Army recently announced the launch of the Army U, a complete online university degree program available to all Army personnel. In June 2000, the European Commission formally integrated e-learning into its global plan for 2000-2003, entitled eEurope, and has allocated 13 billion Euro to develop and enhance e-learning throughout the European Community. In China, over a quarter million Chinese students are taking courses from 38 online universities.[1]

What is E-learning?

Definitions of e-learning vary, but most refer to teaching and/or learning that takes place through the Internet. Elliott Masie, a leading proponent of e-learning defines it as "the use of network technology to design, deliver, select, administer and extend learning." Cisco Systems provides an expanded definition, saying that the "components can include content delivered in multiple formats, management of the learning experience, and a networked community of learners, content developers and experts."[2]

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[1] Harris, K., Logan, D. and Lundy, J. (July 3, 2001) *E-Learning: Ten Big Trends Worth Watching,* Gartner Advisory Research Note – Technology.
[2] http://www.learnframe.com/aboutelearning/

E-learning's Rapid Growth

Many believe that e-learning can make the learning experience richer, more engaging and more interactive and that it provides faster learning at reduced costs, dramatically expands access to learning, and assures clear accountability for all parties in the learning process. The expectations about the growth of e-learning is so great that in the year 2000, four U.S. investment firms conducted detailed market analyses of what they refer to as the e-learning sector, and encouraged their clients to consider investing in e-learning companies. They projected remarkable growth in online learning worldwide and have backed up their recommendations with dramatic statistics and claims. For example:

- John Chambers, CEO of Cisco Systems argues that, "Education over the Internet is going to be so big it is going to make e-mail look like a rounding error." *(Close, Humphreys and Ruttenbur, SunTrust Equitable Securities, March 2000)[i]*

- Seventy percent of the world's top tier companies cite lack of trained employees as their number one barrier to sustaining growth. (PricewaterhouseCoopers, May 15, 2000 issue of *Fortune Magazine)*

- In 1999, US corporations spent $66 billion on training. About 20% of that was spent on e-learning and 80% on traditional classroom instruction. The Corporate University Xchange (*http://www.corpu.com)* projects a shift to 40% e-learning and 60% classroom instruction by 2003, whereas Merrill Lynch analysts are even more positive, predicting that by 2002, technology-based training will capture the majority of dollars for IT training, at 55% versus the 45% share captured by instructor-led methods. (*Moe, 2000)* The online training market is expected to nearly double in size every year, reaching approximately $11.5 billion by 2003. (*Urdan and Weggen, 2000)[ii]*

- Venture capitalists see the growth potential of e-learning. Over US$1 billion in private capital has been distributed to e-learning companies and more than US$302 million in public equity was raised in 1999 alone. (*Close, Humphreys and Ruttenbur, SunTrust Equitable Securities, March 2000)*

- Knowledge services – education and corporate learning for the new economy – is a $2-trillion industry globally. (*Moe, 2000)*[iii]

- E-learning will become an imperative for enterprises to reskill, retool and keep pace with the changing technological and business environment. *(GartnerGroup, 2001)[3]*

- By 2005, e-learning will be an accepted practice on 70 percent of customer Web sites *(GarntnerGroup 2001)*

Types of E-learning Companies

E-learning companies tend to fall into one of the following categories:

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[3] Harris, K., Logan, D., and Lundy, J. (July 3, 2001) *E-Learning: Ten Big Trends Worth Watching,* Gartner Advisory Research Note – Technology.

- *Providers of content – often corporate and IT training.* Within this category are three subcategories: companies that develop content and sell to all who choose to enroll; those that aggregate content developed by others, and those that custom design content for the specific needs of an organization. Two organizations that evaluate online courses are LGuide.com and Brandon-Hall.com.

- *Providers of learning platforms.* These companies provide a range of software programs that facilitate the development and delivery of online courses, ranging from content creation to learner registration and course record-keeping.

- *Learning hubs* or portal companies offer learners or organizations consolidated access to learning and training resources from multiple sources.

- *A complete package.* Some e-learning companies are attempting to do all of the above.

Of course, many traditional educational institutions, particularly at the tertiary level, also are offering courses and degree programs online, and may be the largest providers of e-learning.

Increased access to the Internet and greater bandwidth are expected to increase the number of individuals moving into online learning. International Data Corporation (IDC) forecasts that there will be 320 million Internet users worldwide by the end of 2002, up from 97 million at the end of 1998. And broadband connectivity is expected to grow from approximately one million households in 2000 to almost 26 million by 2003 (Close et al. 2000). See graphs 1 and 2 below.

Graph 1: Internet users worldwide
     (In millions)
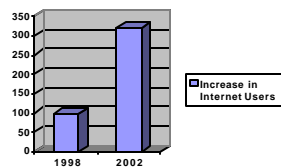
Graph 2: Broadband connectivity
     (In millions)

Source: IDC
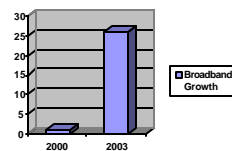
Source: Close et al. 2000

Broadband access increases the speed of Internet access and does away with the frustration of waiting for Web pages to download – a disincentive for the e-learning process. A study conducted by MediaOne found that households with broadband cable Internet connections averaged 22.5 hours of usage per week as compared with just 4.7 hours for households with dial-up connections.

Benefits of E-Learning

There are a number of benefits to learning online that are unique to the medium:

- *Any time.* A participant can access the learning program at any time that is convenient (24/7) not just during the specific 1-3-hour period that is set for a conventional course. Cross-time-zone communication, difficult to arrange in real time, is as easy as talking to someone across town when using the Internet.

- *Any place.* Participants do not have to meet in person, nor even be in the same country as the teacher. Students and teachers can be anywhere in the world. International sharing is feasible, and in fact, often makes the learning experience richer and more interesting to learners. Individuals can log on at work, home, the library, in a community learning center or from their hotel when traveling.

- *Asynchronous interaction*. Unlike face-to-face or telephone conversations, electronic mail does not require participants to respond immediately. As a result, interactions can be more succinct, considered and to-the-point. Learners have time to craft their responses, and to think about what others in the course have written. This, in turn, can lead to more thoughtful and creative conversations.

- *Group collaboration*. Electronic messaging creates new opportunities for groups to work together, creating shared electronic conversations that can be thoughtful and more permanent than voice conversations. Sometimes aided by on-line moderators, these net seminars can be powerful learning and problem-solving experiences.

- *New educational approaches*. Many new options and learning strategies become economically feasible through online courses. For instance, the technology makes it feasible to utilize faculty anywhere in the world and to put together faculty teams that include master teachers, researchers, scientists, and experienced educators. Online courses also can provide unique opportunities for teachers to share innovations in their own work with the immediate support of electronic groups and expert faculty.

- *Enriched learning through simulations, gaming and interactivity*. Academic and workplace research shows increased understanding and more enduring learning when learning activities engage students and immerse them in experiencing the activity or skill being taught. Simulations, games and online collaborations are being used increasingly in e-learning environments.

- *Integration of computers*. The online learner has access to a computer, so computer applications can be used without excluding some participants. This means, for instance, that a mathematical model implemented in a spreadsheet can easily be incorporated into a lesson and downloaded so all participants can run, explore, and refine the model and then share their findings and improvements.

- *Performance Support* Some e-learning providers are also providing workers with on-the-job performance support to boost task performance directly related to business goals and the learning experience.

For emerging economies, a number of obstacles to job-related training can be overcome with e-learning, including a shortage of instructors, difficult travel, and access to digitally-captured training on older technologies more prevalent in developing countries. In addition, education and training opportunities are often limited in these contexts, and e-learning can expand access beyond national boundaries. GartnerGroup predicts that by 2004, governments in the top 10 most-aggressive emerging economies will support online universities as part of their e-government initiatives.

Does E-Learning Work?

The individualized interactivity provided by an Internet-connected computer is believed to contribute significantly to the effectiveness of the online learning environment. Studies have shown that individualized learning environments are considerably more interactive than

traditional classroom environments, and a well-designed computer-based or online learning program can offer much more opportunity for individualized interactivity than is available in most classrooms. For example, as the graph below shows, the average number of questions a teacher asks in one classroom hour is three, and the average number of questions asked by one student during one classroom hour is less than one. However, when learners are in a one-on-one tutoring environment, they typically ask up to 21 questions per hour and tutors ask and students answer an average of <u>117</u> questions per hour.

Graph 3: Numbers of Questions Asked and Answered in Classrooms vs. One-on-One Tutoring Session – One Hour
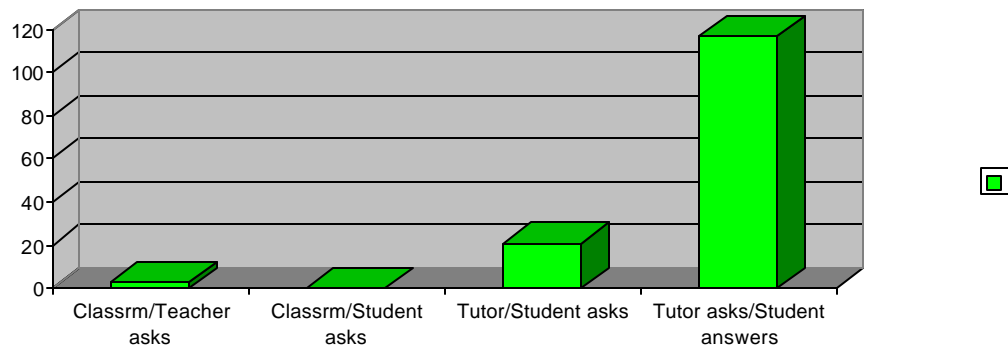
Source: Woolf and Regain (2000) [iv]

In a classroom, teachers are seldom able to spend more than a couple of minutes with any one student – if even that amount. Consequently, students have few opportunities for interactivity and must often work on their own. If the student does not understand the skill or concept, then he or she may be practicing problems or exercises incorrectly, or developing inaccurate conceptions.

The effectiveness of distance education has been studied for almost 100 years, with new studies and reviews conducted of each new technology. An online database of study findings in distance education and, more recently, online learning is maintained by year for each year since 1928 at http://teleeducation.nb.ca/nosig. A 1990 review of computer-based instructional programs using interactive videodisc (an early version of CD-Roms and DVD and the precursor to online learning) to train adults across a range of sectors revealed consistently positive findings. Of the 21 studies that compared the computer-based training with traditional instruction, all showed equal or significantly superior performance of the computer-based students, and eight studies found that these students learned in less time with savings ranging from 10% to 60% and from 4.7 hours to 8 hours (Capper, 1990) [v]. Studies represented a range of subjects, topics, sectors and settings, including health (giving intra-muscular injections or CPR), college science, management training, sales training, military terrain analysis, troubleshooting and repair of large and costly equipment, use of a 35 mm camera, use of hazardous materials in the workplace, and smoking cessation.

The positive findings of interactive videodisc were confirmed in more recent studies conducted of online learning. As with almost all studies of distance education that have been

conducted, those comparing online learning with face-to-face traditional learning show either no significant difference, or results that favor the online mode. (See http://teleeducation.nb.ca/nosig.)

The message that consistently emerges from this long history of studies is this: "The delivery mode we know for a fact does not impact the learning. It's the design of the instruction that impacts the learning, and also what the students bring to the instructional situation." Carnevale, C. (2001).[vi] Tables 1 and 2 show the impact that more robustly-designed instruction can have on both learning achievement and time-to-mastery. Table 1 shows comparisons between traditional computer-based instructional programs at various levels, and the more robust knowledge-based tutoring programs developed recently.

Table 1 shows that on average, across levels of education and training, the 233 computer-assisted instructional (CAI) studies resulted in increased learner performance from the 50th percentile to about the 65th percentile (Kulik, 1994, Fletcher, 1997[vii]). But the three studies of the more recently-developed, and much more robust knowledge-based tutoring programs resulted in increased learner performance from the 50th percentile to about the 84th percentile, and Table 2 shows that this increased performance is accomplished in 55% less time than traditional instruction. In fact, contractors who bid to develop online training for the U. S. military bid on the promise of reducing time to mastery by 50%. Such time savings can result in substantial cost savings particularly in corporate settings, but also have the potential to rethink the structure of vocational training, or even perhaps secondary and tertiary education. (Fletcher, in press)[viii].

Table 1: Some Effect Sizes Achieved with CAI and Knowledge-Based Tutors

Instructional Setting and Courseware Type	Number of Studies	Effect Size	(%) Performance Increase Compared to Trad'l Instruction
Elementary School (CAI)	28	0.47	68
Secondary School (CAI)	42	0.42	66
Tertiary Education (CAI)	101	0.26	60
Adult Education (CAI)	24	0.42	66
Military Training (CAI	38	0.40	66
Average Effect Size (CAI)	233	0.39	65
Tertiary Education (Knowledge-Based Tutors)	1	0.97	83
Military Training (Knowledge-Based Tutors)	1	1.02	84
Secondary School (Knowledge-Based Tutors)	1	1.00	84
Avaerage Effect Size (Knowledge-Based Tutors)	3	1.00	84

Source: Woolf and Regain (2000)

Table 2: Reduction in Time Needed to Reach Instructional Objectives for CAI and Knowledge-Based Tutors

Instructional Setting and Courseware Type	Number of Studies	Percent Time Reduced
Military Training (CAI)	23	28
Military Training (CAI)	N/A	30
Tertiary Education (CAI)	17	34
Adult Education (CAI)	15	24
Avaerage Time Reduction (CAI)	55+	29
Tertiary Education (Knowledge-Based Tutors)	3	55

Source: Woolf and Regain (2000)

Courses designed for online learning tend to be much more richly developed than are conventional courses where the instructor expects to be able to provide clarifications as questions arise. In fact, e-learning directors interviewed stress that it is important to completely reinvent how a course is taught when it is put online - that simply putting PowerPoint slides onto the Web will not result in high-quality learning. They claim that the online courses they develop are highly robust - are specifically designed for Web-based learning, attempt to have all the learning resources embedded into the course, and include detailed tracking and reporting tools. Table 3 at the end of this section summarizes the benefits, limitations, evidence of effectiveness and approximate costs of a range of educational technologies, including radio, TV, CD-Roms, computers and the Internet.

Costs and Quality

Not all courses delivered over the Internet are of equally high quality or effectiveness. Jackson (2000)[ix] describes how variable costs and quality of online courses can be and provides for exemplary scenarios of online learning.

1) **Web Lecture Hall:** Students read assigned materials, take in streaming audio or video lectures by an eminent professor, and complete multiple-choice exercises for which the answers are provided. At the end of the course, students go to one or more test centers to take a proctored multiple-choice examination, which is scored either by clerks using templates or by computer. *This model will have moderate start-up costs for the production of the audio and moderate to high costs for the production of video, but if they are already available, the conversion cost to stream them on the Web are relatively low.*

2) **Web-Mediated Seminar:** A syllabus posted on the Web indicates the required and suggested readings for a particular course. A senior instructor leads a group of 10-12 students through a weekly electronic discussion of the assigned readings, overarching themes, and issues raised by the students. Each student prepares a research paper through a three-step process: an outline is submitted through e-mail for feedback by the instructor and two other participating students, a draft paper is submitted for feedback from the instructor and two students, and finally the revised paper is submitted. *This model has low startup costs–about two hours of an apprentice Web developer's time to convert the*

syllabus to an HTML document and to configure the software for the electronic discussions, and a few hours to train the instructor to use the technology. The delivery costs per student, however, will be fairly high because of the considerable time the mid-level instructor spends providing feedback to individual students.

3) **Web Portal Course:** A senior instructor, an instructional designer, and a Web developer jointly create a Web-based course portal that includes a detailed study guide, textbook, other required and optional readings, FAQs (frequently asked questions and answers), multiple choice quizzes with automatic scoring and debriefing, and links to databases, professional organizations, and other resources related to the topic. Junior instructors answer individual questions via e-mail. Students go to one or more test centers to take a proctored examination with multiple-choice questions and a short essay. The examinations are scored as in the first example above, and the essays are graded by junior instructors. *This course model involves moderate startup costs, including a few days of collaborative planning by the senior instruction, instructional designer, and Web developer; several days of a research assistant's time to find the rich array of resources; several days of the instructor's time to select the best resources and to develop the quiz materials and FAQs; a few days of the instructional designer's time to optimize the content presentation, and a few more days of a Web-developer's time to create the Web site. The delivery costs per student will be moderate, because of modest demands on the Web server and there will be only limited instructor-student interaction and that will be handled by a junior instructor. For some subject matter, highly effective instruction may still be possible because the portal includes extensive exercises with automated scoring and debriefing for incorrect answers.*

4) **Web Multimedia Tutor:** A Web-based artificial intelligence tutor is created to guide each student's learning. It adapts the instruction and feedback partly according to the individual student's interests, learning styles, prior knowledge and skills, and progress throughout the tutoring. The instruction is based on a large learning bank of texts, videos, and animated simulations that instruct, assess the student's learning, and provide automated feedback. *The Web Multimedia Tutor does conform with the impression that Web-based courses have high development costs and low delivery costs per student. The cost for development, with current technologies, often exceeds $500,000 per hour of instruction. The costs for delivery will be relatively low because it operates without human instructors. Yet these costs are not zero because the Tutor would require considerable Web-server computer capacity and broadband connectivity.*

Jackson argues that while economies-of-scale are expected to lead to reduced costs, a number of the costs related to delivering courses online tend to vary due to levels of expansion in enrollments and periodically from obsolescence of hardware and software. He concludes, however, that cost estimates may need to consider the fact that the Web offers unparalleled opportunities to provide just-in-time customized education and training, and that additional cost savings come from not having to provide classroom facilities, dormitories, computer labs, study carols, and dining hall facilities. In addition, part-time instructors working out of their homes reduce the need for faculty office space.

Jung (2000)[x] conducted one of the few cost-comparison studies available. Her findings show that the development and delivery costs for online courses offered by Korea National Open University decreased over time from US$12,768 in 1998 when the courses were first developed, to US$7,902 in 1999 and had almost twice the course completion rate of a traditional course

(55.2% vs. 93%). Over 15 online courses, the per-student cost averaged US$111. [4]

Some e-learning companies tailor material to their client's needs and provide instant updates on the latest developments in their client's field of interest. This means that the information disseminated to the individual learner is the latest available. In business, where knowledge is a competitive asset, this is critical variable in assessing the potential of the Internet's cost-effectiveness.

Barriers to Effective Use of E-Learning

GartnerGroup acknowledges the current barriers that prevent more widespread use of e-learning, including high cost, complex and time-consuming implementation, and a shortage of high-quality course content. [5] Recent trends to package the various products involved in delivering e-learning, such as tools for authoring, content management and course delivery will simplify the process of setting up an e-learning system, and reduce the costs per student or course. Other barriers include limitations in course offerings, most of which are targeted at the larger-sized corporate market, and language of courses, most of which are in English. In addition, little content has been developed for groups with lower levels of literacy and there appears to be very few online courses targeted to the training needs of micro and small businesses.

Some risks associated with the business of e-learning include: continually changing technology, the need for major behavioral changes on the part of users, e-learning companies going under or merging due to lack of profitability.

Promise for Development

Most developing countries have tremendous education and training needs. Many countries do not have adequate numbers of IT professionals and most companies and government agencies will need to spend considerable investments in preparing their current staff to use information technology in their jobs. The demand for secondary and tertiary education has been increasing rapidly as countries grow more successful at providing universal primary education. Internet-based learning offers the possibility of expanding that access. Upgrading of government staff, health workers and teachers is an ongoing process and the current training-of-trainers approaches often suffer from quality dissipation as the training works its way down the cascaded system. The plague of HIV/AIDS is exacerbating already existing shortages of trained teachers and other workers and in some countries, two people are being trained for every one that is needed to replace teachers lost to this ravage.

The Internet is increasingly being used for upgrading teachers' skills and knowledge, and has the potential to overcome several barriers that often inhibit teacher learning. Online teacher development efforts provide teachers with greater control of when and where they'll take part; are much less expensive than paying for the food, transportation, lodging, and substitutes that are required to take teachers out of their classrooms for extended periods; and make it possible to link teachers' learning experience directly with the instruction going on in their classrooms. The

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[4] IBM reports annual savings of well over $200 million by adopting e-learning (Financial Times, April, 2002).

[5] Businesses have emerged to assist consumers in evaluating the quality of e-learning courses. See for example www.Lguide.com

Internet is also helping foster professional development simply by offering teachers a wealth of information that would be difficult to access any other way.

The GartnerGroup argues that "access to the Internet and e-learning will make the universal goal of educating the general population and the workforce more achievable. This will impact some aspect of business for every enterprise and will influence culture and society, workforce diversity, application complexity and developmental spending. They recommend that "Enterprises assess the impact of these trends on their business and define a strategy and timeline to adapt, at a minimum, e-learning or, optimally, to exploit and leverage it." (p. 7)

At this point it is not reasonable to expect that most individuals can afford a computer at home. But what is viable are community technology learning centers with broadband access and staff who are trained to access online distance education opportunities and provide tutoring support to individuals and groups as they engage in learning activities. Such centers can be connected to schools, hospitals, clinics or other community service centers where community members congregate and the existing needs are strong. However, few centers have been established for the purpose of online learning. Most are set up to provide basic Internet and computer access, but seldom do they have a focus on e-learning access. (See discussion of telecenters in Chapter x of this report).

It is not yet clear what it would take to make such centers work for purposes of expanding access to education and training, but with the compelling evidence in support of Internet-based learning and the growing array of learning opportunities available through the Internet, it seems worth the effort to experiment, study, refine and disseminate knowledge about this new approach to education and training.

The next section contains descriptions of international best practice around the world in the use of e-learning, and reports on a number of new approaches to using technology to provide professional development to teachers.

Table 3: Benefits, Limitations, Evidence of Effectiveness and Costs of Various Educational Technologies

Technology	Benefits	Limitations	Evidence of Effectiveness	Costs/approx.
Radio/IRI	Can reach distant learners who may not have skilled teacher in specific subjects. Radios access is widespread in most countries. Doesn't require electricity.	No visual images. One way only. Not truly interactive.	Documented as effective over 25 years and in many contexts. IRI mostly used at primary level.	$2-3 per student annual recurrent costs
Audio and Videotapes	Allows repeated listening or viewing of programming.	Requires audio/video player	Documented as effective learning supports	Players range from US$100 to $300. Tapes $0.25-1.00 each.
CD-ROM and DVD	Hold text, graphics, sound and video. DVD Much larger capacity than videotape or CD-ROM Both less destructible than tape	Requires computer, CD or DVD player	Documented as effective learning support	Player approximately US$300 and going down.
TV	Visual images enhance memory, understanding and interest. Can reach distant learners who may not have access to skilled teachers.	Not interactive. Requires electricity. TV density very limited in many countries.	Documented as effective over 50 years at all age levels and subjects.	Expensive and highly-variable costs. Estimates of $0.75 for 1,250 students to $18 for 50 students per broadcast hour.
Computers	Applications that facilitate work and learning Software and tools can facilitate learning of basic skills and complex concepts Often results in increased student motivation and parental support Facilitates administrative responsibilities	Limited interactivity Requires electrification, technical support, secured rooms, teacher training Requires integrating into curriculum & exams	Well-documented for computer-assisted instruction/drill & practice. Effective for some applications aimed at developing higher-level thinking skills. Dependent in part on teacher's abilities.	US$1,000 to $2,000 per computer. Support services, training, etc. estimated at five times cost of computer

Internet	Same benefits as computer. Access to extensive array of valuable learning resources Highly interactive Facilitates constructivist and authentic learning. Facilitates collaborative learning and increased understanding of other cultures. Useful for teacher support	Same as for computer Requires some form of connectivity – limited in most developing countries and particularly rural areas Connectivity can be costly in some countries	Documented as effective	Varies substantially, largely dependent on telecommunications policies and availability of competition. E-rates for schools help reduce costs
E-Readers	Hold up to 100 books or 40,000 pages of text	Requires access to Internet	No evidence	$200 each

INTERNATIONAL USES OF E-LEARNING

Global interest in e-learning is growing rapidly, and in fact, the Gartner Group reports that e-learning is being adopted more quickly and universally than many other "e" efforts.[xi] In an analysis of published reports on Internet usage, Gartner found specific initiatives focused on distance learning and Internet-based education in all 25 of the world's most populous countries, and interest is growing in government, educational and commercial organizations worldwide.

Several nations have established an e-learning policy and allocated resources to promote the use of e-learning for a variety of constituencies and purposes. Most have been targeted at developing national human capacity and promoting lifelong learning, in recognition of the growing importance of human capital for competing in the new global economy.

International Efforts in E-Learning

UNDP. The United Nations Public-Private Partnerships for the Urban Environment offers distance learning as part of their Global Learning Network. According to published information from its Web site, "UNDP and Yale University initiated distance learning as a flexible instrument for universities and other training institutions worldwide to design joint classes on PPP for their students to facilitate the exchange of information between participating universities."

OAS. The Department of Information Technology for Human Development of the Inter-American Agency for Cooperation and Development (IAACD) of the OAS has established The Educational Portal of the Americas, in response to mandates set forth at the Third Summit of the Americas (May 2001) and the Connectivity Agenda for the Americas.

The Educational Portal is an online service to disseminate information on the best quality educational and training opportunities available in distance education, with the aim to allow people of the Hemisphere to take active part in the technological revolution. The OAS's role includes promoting alternative educational methods to meet the needs of disadvantaged segments of the population or of those excluded from formal education systems; and to support and promote lifelong learning for students of all ages, including enhancing the performance of teachers by providing them with opportunities for ongoing professional development. The Educational Portal offers direct links to over 3,500 distance learning programs from the Americas and Europe; access to scholarships available from various organizations; courses for updating teaching skills; news briefs and links to other sites. It also offers chat and discussion forum options on a variety of human resource issues; and a Best Practices section where users can obtain and exchange information regarding innovative and successful educational practices in the region.

OEI. The Organization of Iberio-American States has a mandate from the Ministers of Education in the region to develop an education portal for all OEI member states (members are from 24 countries, including Spain, Portugal, Mexico and Equatorial Guinea as well as all Latin and Central American countries). The purpose of the portal is to provide educational services and training, including courses and scholarships, and to increase Spanish-language and Portuguese content. Their first course is on ethical values conducted in collaboration with Barcelona University, for which 350 teachers are receiving scholarships.

European Commission. In 2000, the European Commission formally integrated e-learning into its global plan for 2000-2003 entitled eEurope. Romano Prodi, president of the Commission argued that "eEurope is a road map to modernize our economy. At the same time, through its e-learning component, it offers everyone, but particularly young people, the skills and tools they need to succeed in the new knowledge-based economy."

Mexico and Latin America

Monterrey Tech's Virtual University has been delivering education at a distance with the use of technology since 1989. It reaches 6,500 graduate students and 58,000 non-credit students a year in ten Latin American countries, and has partnered with the OAS to deliver a 260-hour training program online and through satellite technology to teachers throughout Mexico and Latin America. The Virtual University has partnerships with recognized institutions and universities such as the World Bank, University of British Columbia, University of Texas in Austin, and Carnegie Mellon University. It offers a range of short courses, seminars and degree programs with a primary focus on programs in business, including MBAs and Ph.Ds in business.

University of Quilmes. The state-owned University of Quilmes in Argentina offers a three-year online secondary diploma program in response to a request from the Provincial Bank of Buenos Aires and intends to offer the program in other provinces. The Bank was concerned about the high number of employees who had not completed secondary school. Over 70 percent of the economically active population in Argentina between the ages of 25 and 65 have not completed secondary education, and the nationwide non-completion rate among teens is now 40 percent, a rate exacerbated by the current economic crisis. In 1993, a Federal law mandated completion of at least nine grades of schooling, which has increased the demand for secondary schooling.[6] In addition, Quilmes offers seven online tertiary degrees, including a BA in Education to 1,600 teachers.

FUVIA - Fundación Unidad Virtual Iberoamericana – Ecuador. Fundación UVIA (Unidad Virtual Iberoamericana) proposes to start the first completely online university in Latin America, called: Universidad Virtual Iberoamericana. The foundation is based in Ecuador, and benefits from the academic sponsorship of Universidad Central (the largest public university in Ecuador) and FLACSO – Ecuador (Facultad Latinoamericana de Ciencia Sociales – a pan-Latin-American university), as well as Teacher's College at Columbia University, Universidad Pablo de Olavide (Spain) and Universitá de Girona (Spain). It is also sponsored by local private companies and public institutions, including law firms, an Internet service provider, and the municipality of Quito, Ecuador.

The project intends to offer high-quality education and state-of-the-art technology to disadvantaged social classes and will provide scholarships for both tuition and the technology needed to access e-learning, including a desktop computer and Internet access free of charge. The initial phase of the project will offer scholarships for 100 students for a two-year program resulting in an AA-degree in fields such as: computer science, education and Web-design.

Secondary Education Online. In 2001, the Virtual University of Quilmes in Argentina has developed a three-year completely online secondary degree program at the request of the Provincial Bank of Buenos Aires, which was concerned about the number of employees who had not completed their secondary education[7]. Student enrollment is now at 308, and learner support is provided by staff in the Bank's training department. At present the online program is only available in the Province of Buenos Aires, due to accreditation restrictions, but the University is applying to offer the program in other provinces, which have expressed a keen interest in the program.

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[6] The Province of Buenos Aires requires all students to complete secondary school.
[7] The online curriculum was developed in collaboration with a private secondary school, ECOS.

Training for Small Businesses Online. Competir is an e-learning company based in Buenos Aires. It delivers business-related training to micro, small and medium-sized companies and has over 1,500 hours of coursework and 100,000 learners around the world. Competir has developed MiPymes, an online curriculum of courses, to address the unique needs of micro and small business in Latin America. At present, as many as 5,000 individuals from a range of micro and small business are enrolled in MiPymes online courses, with about 40 percent of those companies having less than ten employees.

Prices vary according to the size of the company, with individual licenses at $80-90 per year, and the average cost per small company is $900 per year. Courses include how to develop a business plan, sales, developing a financial plan, and improving your business through the Internet.

United States

In 1998, the U. S. Congress launched a nationwide year-long study of e-learning, holding hearings around the country and receiving testimony from hundreds of experts in various areas of e-learning. The Web-based Education Commission explored the use of the Internet to enhance learning opportunities for all learners from pre-kindergarten through university, and including corporate training and lifelong learning.

The Commission's recommendations included a national call-to-action to:

➢ Make broadband Internet access widely and equitably available and affordable for all learners

➢ Provide continuous and relevant training and support for educators and administrators at all levels in the use of technology for teaching and learning.

➢ Develop a new research framework of how people learn in the Internet age.

➢ Develop high quality online educational content that meets the highest standards of educational excellence.

➢ Revise outdated regulations that impede innovation and replace them with approaches that embrace anytime, anywhere, and pace learning. This includes rethinking mechanisms and policies regarding granting of credits, degrees, availability of funding, staffing and educational service.

➢ Ensure protection and privacy of online learners.

➢ Ensure sustained funding in support of enhanced teaching and learning via the Internet.

East Asia and the Pacific

Korea. Korea has established a national policy aimed at becoming an "Edutopia" - a nation where everyone can access learning opportunities at any time and in any place. Korea sees education as the centerpiece of its global competitiveness. In 1999, the Ministry of Education more than doubled its allocation to lifelong learning, and in 1998 established the Virtual University Trial Project intended to, in part, fend of competition for distance education from foreign education institutions. The Trial Project was designed to: encourage partnerships, and

sharing of existing resources among universities and the private sector; create a cost-effective virtual education system without diminishing quality; identify appropriate policies and standards for running a virtual university; and share experiences. At the end of the trial, detailed criteria were established for a virtual university and are articulated in the Higher Education Law. A total of 65 universities and five companies participated in the Trial Project, resulting in the creation of 15 virtual entities (Jung, 2000).[xii]

The outcome has been vibrant growth of online education throughout the country and increased collaboration among colleges, universities and companies. Many of these institutions have entered into formal relationships with foreign virtual universities. A University Alliance for Cyber Education has formed with the participation of 70 university and 20 business members. The Alliance conducts seminars, symposia, and faculty workshops, and conducted a survey on the status of cyber education in Korean universities, revealing that more than 150 of the country's 370 universities now offer online education at the institutional level.

To promote e-business in Korea, in 2001, the Ministry of Commerce, Industry and Energy sponsored an e-business Cyber Academy for Women, providing support over a three-year period to promote women's participation in e-business. The Academy will offer programs for e-business professionals and CEOs.

Korea also has instituted a national course credit bank system whereby individuals studying at accredited higher education institutions are able to accumulate course credits in an account and apply them to appropriate certificates or degrees. This program also accepts units earned in private and business-sector programs and a range of other formal and non-formal institutions. Plans are to develop appropriate educational and training standards for use at the higher education level and in industrial training schemes to ensure the quality of the units earned through the Credit Bank System.

China. Nearly one-quarter of a million students take courses from 38 online universities. Beijing University has launched an Internet education portal that it projects will service one million students.

E-Learning for Teachers

Providing professional development to practicing teachers through distance education is not new, and in fact, has a long history in a number of countries. But until quite recently, most distance education has occurred through the use of printed materials, periodic contact with tutors, and perhaps local study groups (Perraton and Potashnik, 1997). Some national school systems, such as China and Mexico, have used television to support teacher development (Chen 2001, Calderoni 1998) with mixed results.

In the past few years, new initiatives that take advantage of the newer Internet and satellite technologies have been developed and several are described below. These initiatives generally have a number of characteristics that support what research has found to be essential for quality teacher development. Research evidence shows that quality teacher development:

➢ Provides opportunities for teachers to observe exemplary teaching practice, and to reflect on and discuss that practice;

➢ Revolves around academic content, curriculum and standards;

➢ Is embedded in teachers' jobs and can be tailored to the needs of the students in their school;

➢ Provides opportunities for teachers to engage deeply in subject matter and pedagogy; and

➢ Is cumulative and sustained

Newer technologies provide the capability to address several common problems in the provision of teacher professional development. The technologies allow school systems to provide training and development that has the following characteristics:

➢ Gives teachers anytime-anyplace access to training materials, resources and communication.

➢ Provides teachers with opportunities to view teaching-practice and to engage in reflective, analytic learning activities and discussions around specific teaching attributes and practices, and allows teachers to access the products related to that practice, such as student work, and teachers' lesson plans.

➢ Provides uniform training quality with the flexibility of local customization[8].

➢ Allows teachers to participate in learning communities, to share ideas, analyses, reflections and resources with their peers and other experts throughout the city, country or even the world.

➢ Provides sustained, ongoing opportunities for development that is affordable.

➢ Provides access to a broad array of teaching and learning resources keyed to a curriculum.

➢ Can be tailored to specific needs and curriculum of an education system.

Each of the teacher development systems described below has distinctive attributes that contributes to its appropriateness for various settings. Table 4 shows how these innovative systems compares on the attributes listed above.

➢ Monterrey Tech, part of the Monterrey Virtual University in Monterrey, Mexico uses both satellite and online learning to deliver training to 25,000 teachers in Mexico and ten Latin American countries. The teaching certificate program consists of 13 courses covering educational technology, educational psychology, developing critical and creative thinking, problem solving, curriculum design and planning, classroom assessment, etc. Courses involve students in online group projects and provide substantial opportunities for online communication with peers and education faculty. Monterrey Tech also has developed online training programs for school principals.

➢ TeachScape.com is a Web-based teacher development system that offers teachers access to annotated video cases and subject courses. Each lesson has multiple videos of exemplary teaching in that area, accompanied by sample lesson plans, learning activities, student work and guides for assessing student work. TeachScape is designed to provide teachers with observations of exemplary teachers in action, opportunities for them to analyze the instructional practice they see in the videos, to compare it with their own practice, to discuss solutions to common teaching and learning challenges, and to define more effective strategies with their peers and online mentors. It allows for online learning communities and study groups, formed to reflect on and analyze teaching practice, flexible groups that can be formed around subjects, topics or themes, and can be

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[8]With most cascade, or training-of-trainers, approaches, training quality tends to dissipate rapidly.

facilitated by a range of district, state or national experts. The TeachScape online platform contains a library of content and resources aligned to local academic standards, instructional objectives and curricula, and allows teachers to keep track of their own learning progress over time.

➢ Shoma is a public-private partnership in South Africa aimed at providing high-quality teacher development, particularly to teachers in rural areas. The Shoma program has produced about 200 10-12-minute very high quality videos of teaching content and pedagogy and accompanying computer-based lessons for teachers in grades 1-12. The videos provide explanations of various desired teaching strategies, generally embedded within an academic subject. Explanations are introduced by both expert researchers and exemplary teachers, and are accompanied by demonstrations in real classroom settings. To date though, teachers have not had Internet access, so teachers must travel to a regional center to access the videos and computer lessons, and are able to access the learning materials only when they are at the training center. Some of the provinces, however, are introducing Internet-connected computers into schools, which will allow more school-based professional development. Without Internet access, teachers are not able to communicate online with their peers or other experts, other than when they are in the learning sessions, and never with those at a distance.

➢ The Ministry of Education in Brazil began introducing computers into schools in 1997, through the ProInfo program. To support teacher development, each state was provided with ProInfo funds to develop a program to train trainers and teachers to use technology in the classroom. In the State of Rio Grande de Sul, an approach has been developed by faculty researchers at the Cognitive Studies Laboratory (LEC) at the University of Rio Grande de Sul. The LEC approach is highly constructivist and strongly oriented toward project-based learning, both in the way it approaches the training of teachers and in the pedagogical approach it encourages teachers to use with students. After teachers have participated in a face-to-face session introducing them to the use of computers as teaching and learning tools, a more advanced 4.5-month course was offered completely online to 500 teachers and trainers throughout the country – with an emphasis on project-based learning. Teachers collaborate in this learning with local trainers and, in some cases, their students, selecting and researching projects that they choose together. The trainers and facilitators for the course are from a number of universities around Brazil and serve different roles in the course. Some offer academic workshops in school subjects, others offer technical workshops in computer and Internet teaching skills and strategies, and others encourage and support teachers to engage in project-based learning. From the central Ministry of Education office, ongoing, sustained online support is provided to teacher trainers, computer lab coordinators and increasingly to teachers, and has resulted in a very active and enthusiastic nationwide teacher online network.

➢ LessonLab.com also is an online video-based program developed to help teachers improve their teaching by seeing others teach, reflecting on what they see other teachers do, analyzing that teaching, and working with others to improve their own teaching. LessonLab provides an ever-growing library of videos of complete lessons of teachers from around the world, in an attempt to make the act of teaching public, and to provide teachers with opportunities to think together about ways to improve teaching. It allows teachers to get support in thinking about what they are doing, and to collaborate with their peers at their own school in this process of reflective engagement. Also embedded are resources related to each lesson, such as students' work, or a teacher's quiz or lesson plan, and all lessons are keyed to the content standards for that district or state. The

learning platform also allows groups of teachers to create their own digital libraries of teaching practice and to share their work with their colleagues; and course developers can use LessonLab to create online courses.

➢ The Virtual High School (VHS) was developed to provide courses online to secondary students in small rural schools that may have limited course offerings due to their small size. To aid in that endeavor, teachers who deliver the online courses receive 26-weeks of training in how to design and deliver such courses.

While some of these approaches are too new for a formal evaluations of effectiveness, case studies of the Shoma and Brazil approaches have been conducted and are available at www.the3TConnection.org, and studies of the Virtual High School are reported online at www.concord.org.   Table 5 shows how each of these teacher development approaches compare on the attributes listed earlier.

TABLE 5: ATTRIBUTES OF NEWER TECHNOLOGY-BASED TEACHER PROFESSIONAL DEVELOPMENT APPROACHES

	Access Rural - urban 24/7	Uniform quality in content	Online teacher control and interactivity	Sustained, ongoing prof. Dev.	Visual images of teaching	Access to teaching-learning resources [9]	Can be tailored to different systems
Shoma	R/U – not 24/7	X		24/25 weeks	X		
VHS Tchr Dev.	X		X	26 weeks			X
Monterrey – online only	X	X	X	260 hours		X	
Teach Scape	X	X	X	X	X	X	X
Lesson Lab	X		X	X	X	X	X
ProInfo/L EC	X		X	4.5 months			

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[9] While anyone who has Internet access can access a broad range of teaching and learning resources on the World Wide Web, only those programs that provide the resources embedded into the professional development program and keyed to lessons in that program are checked here.

E-Learning for MSBs and Vocational Training

Many e-learning courses now exist in areas related to operating a small business, but few, if any of these are targeted to an audience that may have low levels of literacy. Lguide.com provides a catalog of online courses that may be appropriate for small businesses, including accounting, finance, marketing, sales, etc. In addition, the most prevalent e-learning courses are in information technology skills, and at the graduate level, MBAs. Little has been done, however, to facilitate access of the poor to e-learning, which will require a range of financial and human support structures.

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