Cybersmart: The Future of Education in the Age of the Internet

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The Internet, by its essence is a means of dissemination of information. **Educational processes** aim to disseminate organize and retain information. These two processes are made for each other. We expect major changes in the educational process will occur from the eventual availability of cheap and wide bandwidth (the capacity of a computer system to transfer and receive information) to the home and to the workplace. Students and educators will benefit from these developments.

Some Facts

There is a proliferation of cyber programs and cyber universities around the country. Peterson's College Guide listing 93 "cyberschools" in 1993 while the 1997 Distance Learning Guide lists 762. About 55 % of the US' 2215 four-year colleges and universities have courses available off-site About 1 million students are now plugged into the virtual college classroom[1] while about 13 million attend brick-and-mortar classrooms. That number of cyberstudents will likely more than triple by the turn of the century. The University of Phoenix seen in the illustration has a large mix of electronic courses, remote courses, and courses given at satellite locations.

Insert University of Phoenix Picture

This proliferation of remote education reflects the increasing capabilities of technology, the high cost of education, the increasing penetration of computers in the office and the household, and the increasing comfort of the general population with technology.

Advantages and Challenges

Are there advantages to defining a role for cyberspace in education? Most decidedly. The ability to expand education beyond physical campus boundaries and the ability to deliver education at a time and place convenient and effective for student learning will undoubtedly increase the demand for educational services. For example, working students will benefit from the flexibility in time and place of study. From an educational perspective, the ability of the technology to

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[1] Gubernick, L & A. Ebeling, "I got my degree through E-mail," Forbes 06/19/97 or http://207.87.27.10/forbes/97/0616/591208a.htm.

respond to the demonstrated learning pace of the student can increase student interest in the materials, and the ability to re-study sections of the materials not well understood will increase the comprehension and retention of the materials.

Nevertheless, remote education also faces challenges. For example, will the proliferation of course offerings by various institutions impact the quality perceptions of all programs offered through this medium (the "correspondence school" image). How can the public be assured of quality and value? Will the lack of the discipline of a college classroom diminish student focus and perseverance as the course or degree program progresses? Can we effectively deliver all courses with technology, or will we learn as we have with other technologies that the latest advance is not a panacea. For example, how can we provide the learning content normally expected from the Chemistry lab experience? An important element in today's graduate business school environment is faculty-student and student team interaction. How can we foster these important interactions?

Key Issues

While distance education using television transmission has been a noticeable recent phenomenon at some institutions, students of all institutions have been progressively affected by technology. This influence, has been mainly in the use of computers to support the classroom experience and to enhance the effectiveness of student work. In the last two years, the emergence of the Internet has opened the doors for a permanent revolution in the classroom and educational processes. This revolution mixes traditional teaching methodologies with new tools of education.

First, we find the advent of **e-mail** as a tool for the classroom. Teachers and students can communicate out of the classroom environment in an asynchronous manner without the normal difficulties of telephone calls. Instructors often find e-mail helpful to gage class progress and to manage communications with students. It forces students to place their questions and requests in written form, familiarizing them with similar communication expectations in the business environment, and keeps records of requests and course management issues. Students appreciate the extended classroom environment, and the ease of access to faculty. E-mail has often made faculty office hours less populated and more focused on substantive interactions.

Listserv / netnews type technology allows class broadcasts, and the institution of discussion groups and the building of the classroom electronic community. Students may post comments to a bulletin board and/or mail them to the entire class through a listserv. An archiving mechanism can be set up that records and organizes the discussion. Students can visit the site through the Web and retrieve these comments. Electronic communities have a flavor different from traditional ones, as they allow for direct dialogue between students, not exclusively depending on faculty interaction.

Chat rooms can be set up for 'electronic office hours' where students do not have to travel to the college campus, and can be used to create a virtual classroom environment. Also, students can have online group meetings and keep discussion hours.

The **World Wide Web** created an interactive multimedia environment that can be used to support education in many ways. Basic Web text and graphic capabilities allow for the storage of

most types of educational materials and their online retrieval. While the Web currently serves as a domain for research and some text retrieval, it still has not become the pedagogic support phenomenon that we expect to see in the near future. A wide range of technical and accounting related sites already exist on the Web[2], and there are an ever increasing number of proprietary sites that require payment or membership for content retrieval.

Given the major explosion of materials on the Web, it is just a question of time as to when less expensive alternatives to traditional text materials will appear on the Web. New models of distribution and costing will bring major alterations in teaching and study materials. On the other hand, with the simplification of the delivery mechanisms for of multimedia, we should expect major improvements in the nature and type of supporting teaching materials. It is reasonable to expect a mix of CD materials, books, and updates on the Web to progressively take hold of the educational environment.

In the future the Internet will eventually be able to support many forms of video and audio transmission to support education. These advances will allow video-teleconferences between students and faculty from remote locations, avoiding cumbersome and expensive commutes and an increasing choice of alternate educational offerings.

Today, a major impediment to the remote receipt of high quality video, audio and graphics lies in the limited bandwidth (the ability to transmit volumes of information quickly) of many systems. The software is available to deliver much more than the average user can effectively receive, so delivery technologies and expanded home communications line services are in the process of addressing this problem. For example, at a major US university, a student enrolled in tis remote-MBA program has to install a dedicated communications line, acquire a suite of selected licensed software, and purchase a computer and peripherals meeting stated requirements. This is hardly the picture of convenience, economy or portability. These trade-offs will be mitigated by technological advances so that in the future, wide access to educational offerings will be assured with commonly available hardware and software.

Enhanced Teaching Environments

In addition to the incorporation of Internet tools to the class environment we can observe the expanded use of more traditional computer technology being incorporated into the environment. We see the increasing adoption of the type of video-teleconferencing that has become common in business. Universities with different campuses, or teaching out of different buildings within a campus are progressively offering interactive classes from more than one environment. Some efforts have gone into educating home-bound students (handicapped, mothers with young children) through telecommunication channels.

One basic difference among these technology enhanced plans is the degree of supervision and interaction of the educational plan. Some institutions will issue mail-order type programs with

[2] See Kogan, A., Sudit, E. & Vasarhelyi, M. "The Internet Guide for Accountants," Prentice Hall 1997, chapters 3 and 6 for a wide set of accounting listings.

little supervision, interaction, or assessment. Others will focus on some degree of measurement and enhanced communication but will not provide a mechanism for the actual student / faculty face-to-face interaction. Finally a third set of entities will use technology in creating environments where students and faculty use technology to enhance their contact, replacing some of the existing classroom interfacing with electronic media.

Can Cyber-education be on a Par with Traditional Education?

There is evidence that computer-based instruction can be very effective. Multimedia CD ROM training can be engaging and entertaining, and expanding bandwidth capabilities of systems will permit similar sophisticated applications to be delivered via the Internet. Today, creative applications of vivid graphics and limited motion can be widely delivered with impact. The quality of the courses need not suffer if careful thought is given to the educational objectives of the material, and ways of achieving those objectives are creatively explored. Some courses report that cyber-students (and faculty) spend more total time completing computer courses, with comparable or improved results.

A study by University of Michigan revealed that computer-based instruction produced higher average scores in 81 percent of the cases examined. The San Jose Mercury News analyzed California scores and concluded that computers tend to boost achievement more among lower-income students than among other students. Some preliminary research results indicate that these computer-related findings are also applicable to many automated educational aids like the Internet and video / multimedia.

Some models for the current environment

Complete cybercourses: where teaching materials are organized in logical order and a learning management software monitors student progress through the knowledge set. Wide variations among software and features can be found. Among these we find CyberProf , Data Beam Learning Server and WebCT – (World Wide Web Course Tools). UOL publishing incorporated (**Error! Bookmark not defined.**) provides a menu of interactive courses. A demo course called "Windows on the Web" in interesting.

Insert UOL Picture

College intranets: colleges benefit from the wide-bandwidth and cheap storage capabilities of the tcp/ip (Internet) environment by creating wide textual databases with teaching support materials, made available locally to students. Copyright and intellectual property issues must be sorted out and a new set of economic arrangements developed.

Learning communities: current course structures, degree programs, and certification programs rely on traditional teaching methods. A new order, whereby communities can be formed around subject matters, create a dynamic environment that can progressively change our traditional beliefs about education. Students will connect to working areas, and focus on the subject matter. These discussions can be extended to other matters of interest and build social relationships between the students, subject matter experts, providers, etc.

Corporate Communities: Issues of internet education are equally applicable to the intranets being implemented in corporations. Companies have set up proprietary internal networks based on the principles of the Internet to better transmit and deliver proprietary corporate data. These systems are using *open systems* architecture, a feature borrowed from the Internet. As corporations transform themselves into learning organizations, define their role as Corporate Universities and buy into the concept of lifelong learning, they seek to use Internet technologies to support and transform their educational and training programs.

The Future:

The University Environment will Substantially Change

Universities are notoriously slow to change. A combination of low capitalization, the tenure system, and the fact that many large universities are state-owned creates a rather unwieldy system. The waves of change are here and the environment will never be the same. While the prestigious large universities will resist restructuring for a while, there is much economic and social pressure forcing change. We expect a much changed environment with: extensive electronic support of teaching, modularized curricula, the advent of a large menu of programmatic offerings (in addition to the traditional AB, BS, etc..), and a set of less academic more applied offerings to serve internal corporate training needs.

Learning from the home or office

The locus of learning will change, just as working from home is turning to be an important factor in the business environment. The traditional classroom interaction was based on the economics of clustering students and covering the cost of education. With the advent of wide bandwidth communication, the costs of transportation, university buildings, classrooms and libraries will pit physical interaction against cyber-interaction. The advent of better home connectivity will inevitably tilt this balance. This first will become more obvious with the progressive improvement of home education for the handicapped and home-bound parents.

Cyber teachers

Another important technological advance is the advent of improved user-friendly software working on better and cheaper computers. We expect that the computer will progressively take over some of the routine faculty monitoring and progress analysis functions leading eventually to some form of cyber teachers. An elementary form of such a device would intelligently guide you through a mix of lecture and text materials, with hypertext links for additional information, clarifications and references. It could also monitor progress, give progress tests, perform some sort of learning diagnostic, and transmit relevant data to a faculty monitoring station.

This software could be used in conjunction with interactive tools like chat rooms, desk-based video teleconferencing, and voice communications. The expanded use of mixed media is clearly a major improvement on the remote education experience. Far from a replacement for faculty, such a tool can enhance teaching and research by relieving administrative burdens and low-productivity tasks.

The Rise of a Few Super Universities and Star Teachers

Currently, Universities benefit uniquely from a few "star" professors which develop their reputations from research and non-teaching accomplishments. Teaching faculties tend to have local reputations but a lower research profile. The new economics of education will change the balance of importance between research and teaching, just as television changed the balance of professional sports. Star teachers, that draw audiences with superior communication skills, will bring students to their electronic stadiums and will command progressively higher remuneration and attention. Some universities will reach out to become international universities with students everywhere in the world and satellite campuses in many locations. While the nightmare scenario is a world with only five mega-universities, the most likely outcome is a good number of international institutions in a fiercely competitive environment with some well known universities clearly dominating specific fields or endeavors.

Students Can Already Benefit from the Web

There is a proliferation of materials of great relevance to accounting students on the Web. The Rutgers Accounting Web (**Error! Bookmark not defined.**)

Insert RAW Accounting Resources on the Internet Picture

includes a section called Accounting Resources on the Internet that lists over 200 accounting-related sites on the Internet bringing a wealth of information to enrich and complement alternate courses. These categories list public accounting firms, associations, journals, the FASB, etc.

Furthermore, the RAW hosts many accounting associations including the IMA which publishes this journal.

Insert IMA homepage Picture

The IMA site, has a large number of interesting features including: finding the chapters of the society (identified by a touch- sensitive US map), research studies, society events, a job database, etc.

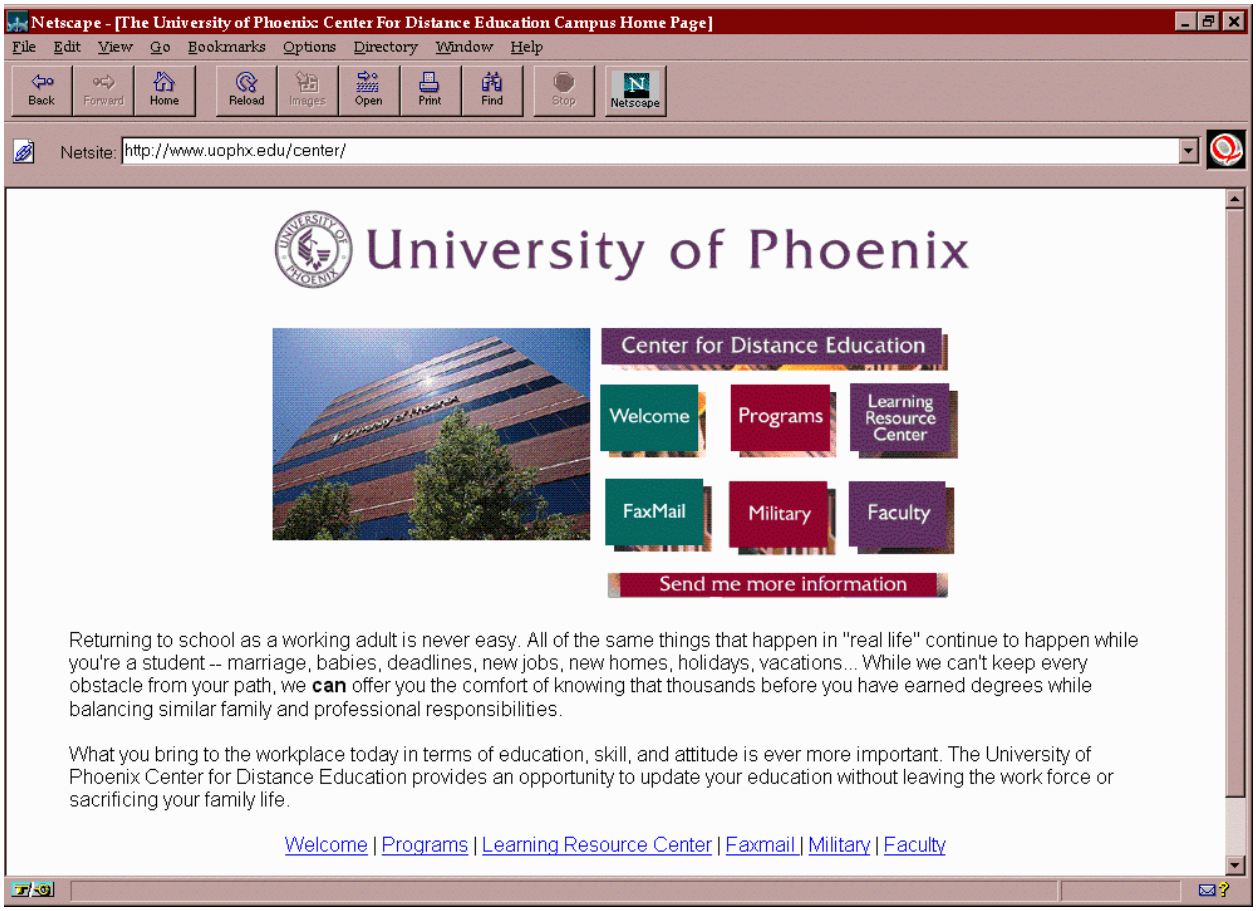
Students can also use Web information to find recent financial statements through the individual company's Web site or through the EDGAR site that contains recent filings with the SEC.

Even if an instructor does not use the Internet in his /her classes, many of the tools described earlier can be used by students to help enhance their communications with colleagues, faculty, work group, etc.

Conclusions

Education and the Internet are on complementary paths. There is transformation underway in education. While some will adopt a conservative path, and cling to the old ways, the truth is that future courses are going to be less expensive, fuller of multimedia experiences, more closely monitored, and many students will be physically more distant from the instructor (if one exists). While these changes are inevitable, they are more likely to be evolutionary than revolutionary till they reach critical mass. The investment necessary for the preparation of effective and competent multimedia teaching-ware and the necessary investments in infrastructure are immense. These are even dwarfed by the costs of the year to year maintenance of hardware / software / and the currency of material. Consequently, change will be slow and economics favor scale and reuse.

Some key questions loom over these scenarios: How many students have adequate computers for home use? How will the Universities handle the enormous investment in teaching-ware? Is cyber-education better than traditional education? How fast will the environment change? What will be the future relation between corporate and academic education? The answers are interesting and subject to conjecture. Most certainly we are entering uncharted territory.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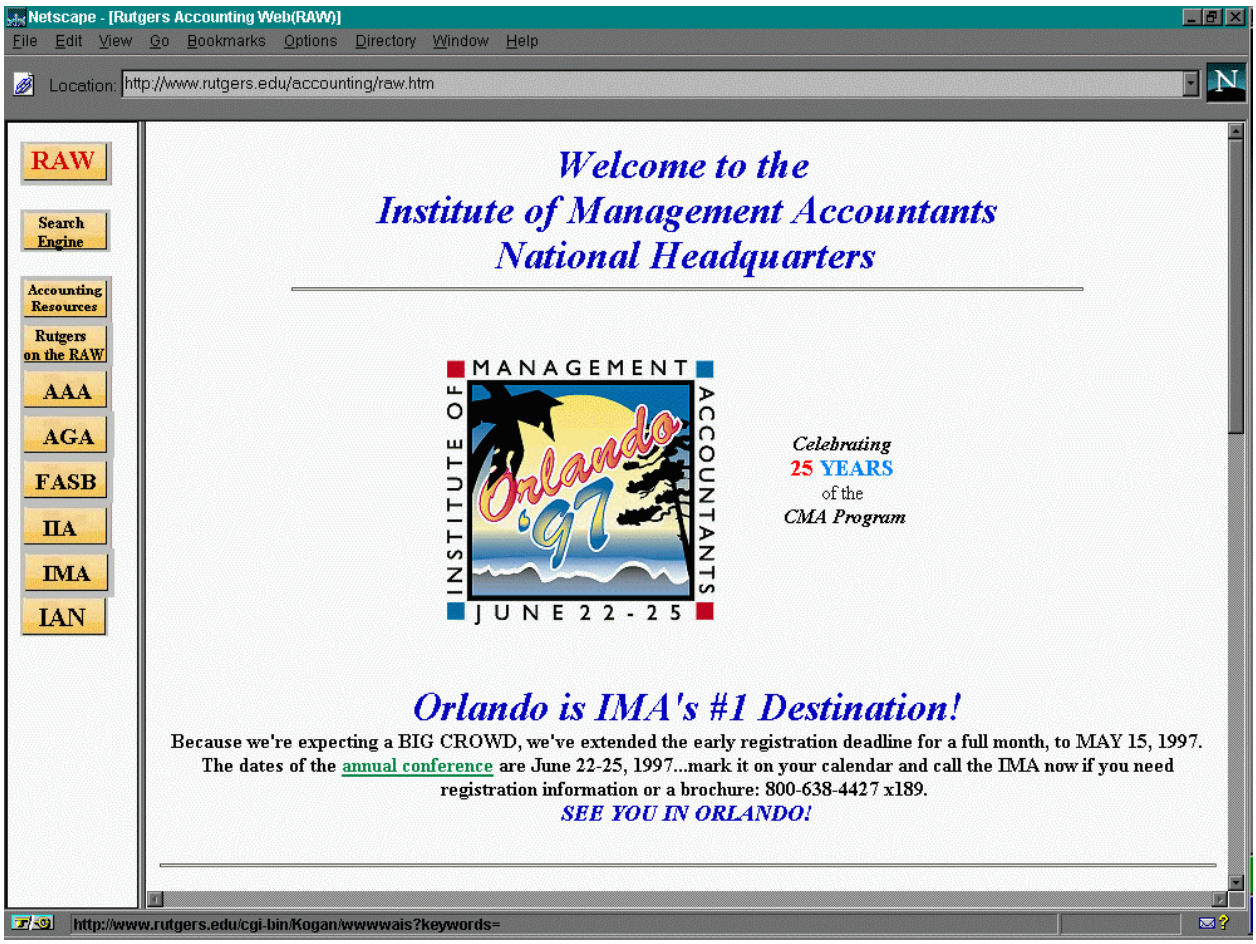
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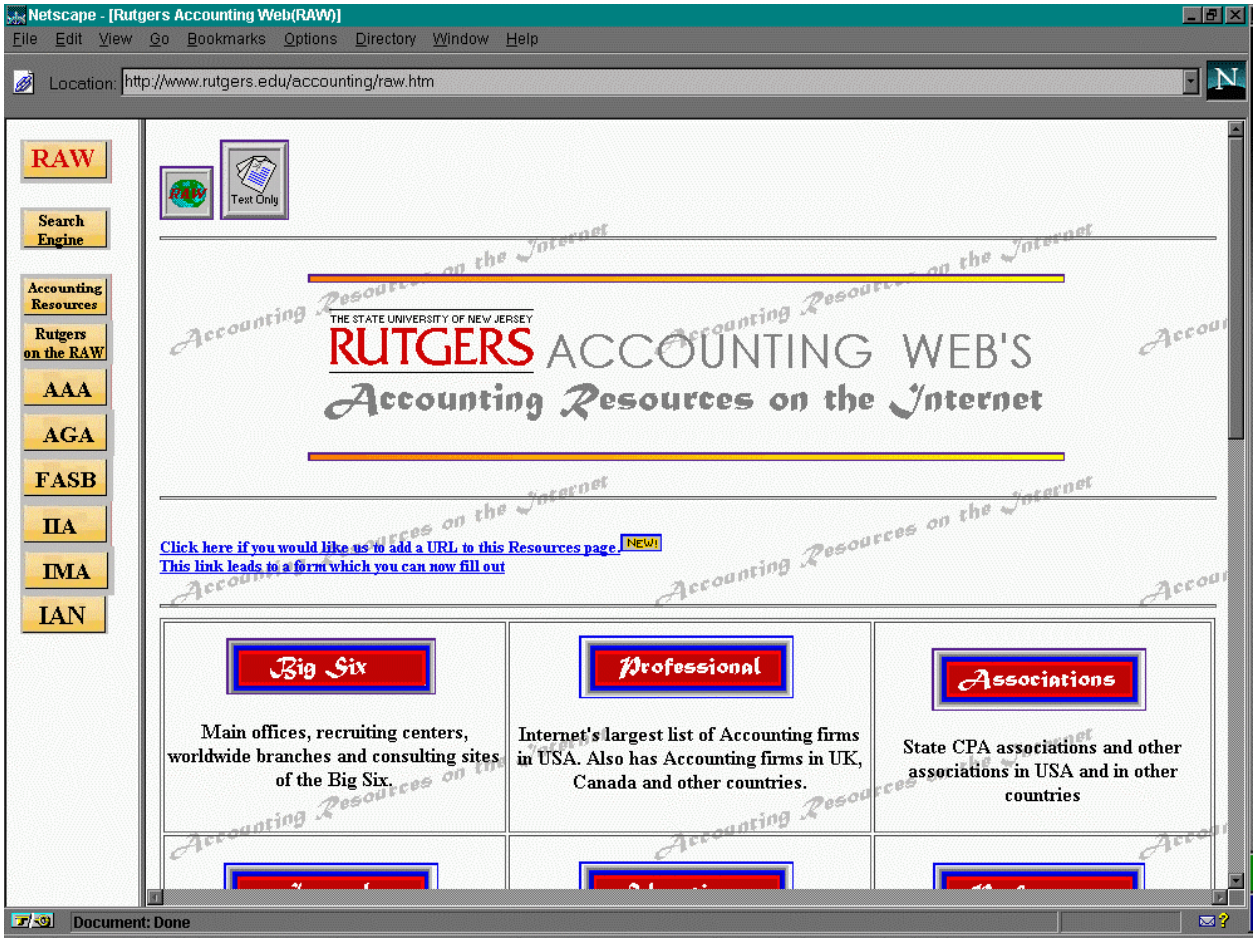
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