ODL research agenda for the 21st century: the context

In the notes that follow, an attempt is made to identify some of the contextual variables that are likely to influence or determine the ODL research agenda in the early years of this new century -- and that already point to some likely directions for that research.

It is clear to all that at the turn of the century we are experiencing seismic shifts in how distance education -- indeed education itself -- is perceived and how it is designed, delivered and administered. These changes in education, as in other walks of life, result largely from the invention of new information, communication and computer based technologies (ICCT’s), particularly those that provide information and communication on-line through the Internet and the World Wide Web.

On-line, web-based, delivery of information and communications, seen by many as the key technological innovation of the last decade of the 20th century, has attracted the attention of mainstream educators to the idea of distance education in a way that no earlier technology managed to do. Furthermore it seems that such interest is likely to increase as new technologies spread fast around the globe, as the cost of bandwidth continues to fall, as the reach of the principal “pipes” for broad bandwidth – such as digital satellite transponders and fiber optic cable – increases, and “last mile” solutions such as digital subscriber lines and coaxial cable become more prevalent.

What are the consequences – and what will be the consequences -- for those of us involved in research, teaching and scholarship in distance education?

There can be no sure answers to that question, but to help begin the discussion, the following are a few thoughts about the context in which our searches are likely to take place.

1. Research will be in a context in which there is a huge increase in the number and variety of institutions offering programs of distance education and in which the core mission of distance education is changing.

A growing number of colleges and universities in every country now offer some form of online distance education. Stimulus (and fear) from competitors on the World Wide Web is pushing unprecedented numbers of institutions to look for ways of delivering programs not only to their traditional constituencies on campus, but also to off-campus, part-time, (generally) adult learners. In US, The National Center for Education Statistics reports that one third of two and four year higher education institutions offered distance education courses during the 1997-98 academic year with another one fifth of all such schools planning to add distance education classes within the next three years. This total would represent over half of the 5,010 higher educational institutions in the United States (NCES, 1999).

A previous study by NCES (1997) which reviewed data from the 1994-95 academic year, indicates that the number of students and number of courses offered through distance education doubled in the time between these two studies. It should be noted that print-based, correspondence study was not included in the definition of distance education used
in either the 1997 or the 1999 study, so the numbers would be considerably higher if such courses were included.

Until now, the core mission of most distance education institutions, using print and correspondence since the 19th century and broadcast and telecommunications technologies since, has been to open access to those who were denied opportunity in the conventional systems. This is changing. Today’s developments in distance education are driven primarily by enthusiasm for technology and a new concept of education as consumer commodity. As a result distance learning may no longer be narrowing the gap between those with knowledge and those who have less, but may in fact be contributing to widening it. To access the new forms of distance education requires first access to the new technology, and this is not equally available, a phenomenon known as the “digital divide”.

In the US, where at the end of 1998 over 40 percent of households owned computers and one-quarter of all households had Internet access, high income households were twenty times more likely to have access to the Internet than low income families. Regardless of income level, Americans living in rural areas are lagging behind those in urban areas in Internet access. Indeed, at the lowest income levels, those in urban areas are more than twice as likely to have Internet access than those earning the same income in rural areas.

Researchers might begin to consider what are the potential and actual economic and social effects of this widening gap in opportunity to access the means of receiving distance learning. Is there truly a re-direction of the distance education mission from being a vehicle for rectifying inequalities and opening opportunities to that of cash-cow for increasing institutional profits? If this is a true characterisation, how do these changing institutional motives impact on teaching methods, curriculum and other educational dynamics?

Should public policy intervene to narrow the gap and if so, how?

For on-line discussion:

i. The Question: what do you consider to be the main researchable question arising from this contextual variable?

ii. The method: How would you research it?

2. Research will be in a context in which conceptual confusion prevails.

With the fast-growing interest in using ICT’s in education, and the adoption of the terminology of distance education by those who use such technologies, and given that in education there is little or no requirement for researchers, teachers or administrators to receive professional training, the field is characterised by wide and growing conceptual confusion. This is damaging from both a practical point of view as well as academically. Practically, with such confusion among those who gather, report and discuss distance education, sometimes what is being studied and reported is the same phenomenon, but often it is not. For example, such a simple matter as a report of growth in programs may be untrustworthy if the definition of what is included in a study in a base year differs from that in the subsequent year. The NCIS exclusion of print based distance education mentioned above is a good illustration of this problem.
Among the simpler challenges this poses for researchers is the need to review a growing volume of literature – much of it available on-line -- that does not carry traditional key terms in its title or descriptors. Much that we need to know about learners, teaching, and organizing distance education that in the past would have been found under descriptors like distance education and distance learning, or independent study, home study, or open learning is now likely to be found in reports about asynchronous learning, on-line learning and learning portals, -- among other recently invented and theoretically meaningless terminologies. Since their authors rarely make connections with established literature, the serious researcher has to do it for him/her self.

We have to learn – and to teach our students -- not to trust electronic data bases, other people’s titles, abstracts and keywords. As for research, a very interesting and valuable project would be a review and analysis of new terminology to show conceptual relationship to the established theories. In reality there seems to be little difference, much of what is written being “new wine in old bottles”.

From an academic point of view the problem is that so many research questions are misdirected because researchers, particularly students who are directed by teachers who do not know the established literature, set out to pose and answer questions ab initio, i.e. in a theoretical vacuum. I have likened theory to a map and the researcher to the explorer; we have the ridiculous situation today in which numerous explorers are discovering new lands that have been perfectly well explored already, while truly unexplored territory remains unnoticed by those who have never bothered to find the existing maps!!

The Question: what do you consider to be the main researchable question arising For online discussion:

i. from this contextual variable?

ii. The method: How would you research it?

3. Research will be in a context in which it is necessary to distinguish among different organizational types.

Distance education delivery systems vary enormously –in the technologies they use, the numbers of students they accommodate, the nature of the contents that are learned, their organizational structures, governance, faculty (teacher) qualifications and training, how they support learners, how they provide instruction, how they evaluate learning and how their learning is recognized in the world. Researchers need to discriminate among the different types of system. Here I will classify programs into three types, as follows:

1. “Mixed mode institutions: i. extending the teacher”
   This is the most common form of distance education in North American higher education as well as in many other parts of the world. Universities are scrambling to add students in dispersed distant locations to courses delivered on the Internet, courses not dissimilar in content and not very dissimilar in instructional method to what is taught by the same teachers in their conventional classrooms. This approach does not require significant changes in institutional governance or resource allocations, and is widely popular for that reason.

   “Mixed mode institutions: ii enhancing the teacher”
Distance learning programs are often used in conventional classrooms under the control of a classroom teacher to fill curricular areas for which there may not be locally available instructors. Such an approach has been popular in schools in the United States for teaching foreign languages and certain mathematics courses. Since this approach simply enriches conventional teaching and does not require any important alteration of organizational or policy arrangements, it is non-threatening to established educational interests and generally popular among educators who want to be seen to be embracing new technology.

2. Single mode DL systems:
In single mode institutions there is no activity other than the design and delivery of courses for distant learners. These include the 20 or more Open Universities. The system includes various sub-systems, including those for planning instructional programs and producing and delivering them through a variety of communications technologies. The work of centrally located subject experts, course designers and technology experts is integrated with local activities of learner groups and the activities of individual learners who are supported by experts in inter-personal interaction and learning, located in schools, colleges, workplaces, homes and elsewhere. No single medium is used but a mixture of text, sound, and video in various forms. Instruction is no longer an individual's work, but the work of teams of specialists, -- media specialists, knowledge specialists, instructional design specialists, and learning specialists. Programs have to be prepared for distribution over a large area, often an entire nation, or at least over whole provinces to large numbers of learners; this requires negotiation and agreements among several or many existing providers; large budgets are needed; long periods of design time are needed. Uniform, high quality is guaranteed, and with large numbers of users, average costs are lower than in conventional education, or in the extended classroom type of education mentioned above.

3. Cooperative model.
The idea of the Cooperative model is that a nation or region does NOT set up a new single mode distance education institution nor depend entirely on extended classroom types of distance education but develops a virtual system that draws on the best national resources, i.e. the content experts, instructional designers, all the range of communications technologies, all the resources needed to provide a learner support system, -- and configures whatever mixture is needed for a particular program or project on a temporary, "mix and match" basis.
Such systems need a small controlling mechanism of administrators, a small team of specialists in design, technology and learner support, to commission, on a contractual basis, the mixture of personnel and other resources needed for each a particular project. The permanent, experienced, control team is one key part of the system; the other is a significant funding resource. The only way the control team can obtain the quality resources needed, on a pro-tem basis, guarantee quality, monitor, train, and in every way maximize the resources available is by the power of funding. What this approach brings about is a very flexible, versatile, responsive system, producing high quality without commitment to on-going institutional costs, and without the tendency to conservatism that blocks on-going innovation within established educational agencies. Above all, it stimulates partnerships and employs the comparative advantage of each institution in a country or region. Consequently there is reduction or avoidance of inefficient duplication while also increasing the quality of programs – since they are produced by those with the comparative advantage in each knowledge field.
The Question: what do you consider to be the main researchable question arising from this contextual variable?

iii. The method: How would you research it?

4. Research will be in a context in which the demographics of the student population are changing and this will lead to change in what is delivered in the educational system.

In most developed countries the majority of workers are many years away from their initial schooling, and even in countries where that is not true, most of what was learned in school become obsolete very quickly as the pace of knowledge change accelerates. Economic factors are inducing if not forcing more of the immediate post-secondary age cohort to abandon the tradition of residential college or university education and to alternate periods of study and work. Since employers, or the students themselves, are more likely to be financing the education (whether in combination with work or in periods between work), they tend to be more demanding of “useful” results than was required by those who previously financed general education, i.e. the family and the state. Tolerance for “frills” and inefficient, out-of-date education is low for students and employers who have limited financial resources and time for study, and at the same time know that knowledge increasingly determines their competitiveness, income, wealth, and social status.

Among the more important questions that may be asked about the effect of these demographic changes and the more consumerist approach of students are questions about what is gained and lost in the curriculum and the impact on the performance of instructors.

For on-line discussion:

i. The Question: what do you consider to be the main researchable question arising from this contextual variable?

ii. The method: How would you research it?

4. Research will be in a context in which all forms of interaction are available on one delivery platform.

What is new in using ICCT’s in distance education is the propensity of the Web to integrate learner-learner interaction from the distance education tradition of the teleconference era of the 1980’s with both learner-content interaction from the independent study tradition and learner-instructor interaction in correspondence teaching.

Certainly the growing number of entrants to the field of online distance teaching means there are more case studies than ever before. Perhaps reflecting their origin in mixed mode forms of distance education where the basic paradigm is the conventional classroom, much of this research focuses on learner-learner collaboration and the formation of learning communities rather than on the more individualized forms of study of traditional, correspondence based distance education. Some researchers believe they are able to show that interpersonal interactions in asynchronous learning environments are similar to those in face-to-face groups. So far the evidence suggests that such teachers are obtaining success in facilitating social interchange, active individual learning, and small group collaborative
learning. There is considerable interest in the effectiveness of social presence as an indicator of learner satisfaction.

It is probably true that asynchronous web communications permits a greater intensity -- and perhaps higher quality,-- of learner-learner collaboration than may have been possible in synchronous audio or video conferencing, -- or even in previous forms of computer conferencing.

Whether the on-line communications mode actually affects the quality of collaborative learning when other variables are controlled, particularly the instructor, remains to be seen. Indeed the many ways in which interaction generally is affected by the integration of media on one “platform” is a huge research agenda that has not yet been addressed.

And the big questions remain i.e. what does any of this have to do with learning? Simply collaborating or interacting should not be an end in itself, -- though often in classroom instruction it seemed to be so. It sometimes seems that the hordes of conventional educators who are now driving the on-line research agenda are bringing to the new field some of those same dubious views about the importance of students being busy. The important research question should be: For what kind of student, in what particular content, is the minimum (because we don’t want to waste peoples’ time) of interaction and collaboration necessary? Distance educators have more often focused on outcomes, objectives, learner performance than those whose job it is to fill set periods of time in classrooms, and it is important that we not lose sight of the value of that tradition!!

For on-line discussion:

i. The Question: what do you consider to be the main researchable question arising from this contextual variable?

ii. The method: How would you research it?

5. Research will be in a context in which there is considerable knowledge but still not enough, regarding learner characteristics.

Current research in programs using new ICCT’s confirm several of the most important facts about distance learning from research in earlier generations, particularly that student achievement in such courses is equal or superior to students enrolled in traditional courses. As before though, little is known about within group differences. Personality assessments reveal that predictors of achievement include such features of autonomy as a sense of self-sufficiency, compulsivity and expedience. Results also reveal that older learners can overcome barriers, through high motivation and good learning style. Overall results indicate inequitable differences in gender for men and women. Access and equity extend to the growing issues of the “digital divide” and the problems with access in rural and inner city urban communities. Studies also show that students who experience distance education display high levels of acceptance of this mode of learning.

For on-line discussion:

i. The Question: what do you consider to be the main researchable question arising from this contextual variable?

ii. The method: How would you research it?
6. Research will be in a context in which management issues must have more attention.

Research in the domain of management focuses on the setting up and maintenance of the human and technical resources as well as the system for managing good quality instructional design, delivering instructional materials, facilitating good interaction and providing good support services.

Management models for designing programs vary depending on the resources and the type of infrastructure needed and available to support these efforts. Program designs often include the use of presentation materials, online conferencing, demonstrations, and online chat sessions. Evaluation is the most effective tool for redesign, so formative assessment tools are integrated into these courses.

Issues for the institutions’ management include:

*How to increase the quality of program design and delivery.* This usually means acquiring access to superior sources of subject knowledge, but also superior skills in course design, and design of presentations by text, audio and video, and superior facilitators of interaction between instructors and learners, learners and learners. It also means heavier up-front investment in design, in training and in establishing learner support systems.

In a report “Quality on the line” commissioned for the National Education Association and Blackboard Inc., the following 24 measures said to be currently in use on US campuses were reported as indicators of a good quality program:

1. A documented technology plan that includes electronic security measures to ensure both quality standards and the integrity and validity of information.
2. The reliability of the technology delivery system is as fail-safe as possible.
3. A centralized system provides support for building and maintaining the distance education infrastructure.
4. Guidelines regarding minimum standards are used for course development, design, and delivery, while learning outcomes—not the availability of existing technology—determine the technology being used to deliver course content.
5. Instructional materials are reviewed periodically to ensure they meet program standards.
6. Courses are designed to require students to engage themselves in analysis, synthesis, and evaluation as part of their course and program requirements.
7. Student interaction with faculty and other students is an essential characteristic and is facilitated through a variety of ways, including voice-mail and/or e-mail.
8. Feedback to student assignments and questions is constructive and provided in a timely manner.
9. Students are instructed in the proper methods of effective research, including assessment of the validity of resources.
10. Before starting an online program, students are advised about the program to determine if they possess the self-motivation and commitment to learn at a distance and if they have access to the minimal technology required by the course design.
11. Students are provided with supplemental course information that outlines course objectives, concepts, and ideas, and learning outcomes for each course are summarized in a clearly written, straightforward statement.
12. Students have access to sufficient library resources that may include a "virtual library" accessible through the World Wide Web.

13. Faculty and students agree upon expectations regarding times for student assignment completion and faculty response.

14. Students receive information about programs, including admission requirements, tuition and fees, books and supplies, technical and proctoring requirements, and student support services.

15. Students are provided with hands-on training and information to aid them in securing material through electronic databases, inter-library loans, government archives, news services, and other sources.

16. Throughout the duration of the course/program, students have access to technical assistance, including detailed instructions regarding the electronic media used, practice sessions prior to the beginning of the course, and convenient access to technical support staff.

17. Questions directed to student service personnel are answered accurately and quickly, with a structured system in place to address student complaints.

18. Technical assistance in course development is available to faculty, who are encouraged to use it.

19. Faculty members are assisted in the transition from classroom teaching to online instruction and are assessed during the process.

20. Instructor training and assistance, including peer mentoring, continues through the progression of the online course.

21. Faculty members are provided with written resources to deal with issues arising from student use of electronically-accessed data.

22. The program's educational effectiveness and teaching/learning process is assessed through an evaluation process that uses several methods and applies specific standards.

23. Data on enrollment, costs, and successful/innovative uses of technology are used to evaluate program effectiveness.

24. Intended learning outcomes are reviewed regularly to ensure clarity, utility, and appropriateness.

**How to reduce unit (average) costs** by spreading the higher fixed costs of distance delivery and world-class pedagogical talent across a larger market (ultimately global like the Web itself); by substituting or complementing full-time tenured faculty by lower-cost adjunct faculty, tutors, and facilitators (some of which do not need specialized subject matter expertise, but rather more the skills of advisors, facilitators, and supporters); and by the use of specialized instructional designers, media specialists, and the like to develop learning materials for web delivery. The labour relations issues involved here are virtually unexplored.

**How to speed up the learning process**, since learners’ time is scarce and expensive, by eliminating transportation time, improving the quality of instruction by abandoning the artisanal approach where a single professor provides all teaching services, for a more industrial or rather, post-industrial one (as above) involving a division of labour and increasingly, as the cost of computing power falls and markets broaden, by building in
individualized instruction adapted to each learner’s learning style through the use of intelligent agents and the like.

*How to provide more flexibility, accommodating different learners with differing availabilities of time who may also have to travel and conduct their learning in different places*

The speedy rate of training delivery is a clear advantage of most electronic learning technologies. Case studies show that self-paced, multimedia training can take 20 to 80 percent less time than instructor-led training, due to a tighter instructional design and learners' option to bypass content already mastered (Training & Development, February 1996). A survey of more than 100 companies shows that multimedia training can reduce learning time by 50 percent, compared with classroom training. 12 Companies such as Apple Computer, Andersen Worldwide, and Storage Technology report less training time with multimedia.

By increasingly using asynchronous technologies (web servers, including streaming video and audio as well as text and graphics, student forums, electronic discussion groups using variations on e-mail technology) as opposed to synchronous technologies (live audio, live video, and chat rooms) – the trend is toward just-in-time learning distributed across time and space to meet the differing needs of learners rather than the requirements of the institutions providing the learning.

For on-line discussion:

i. The Question: what do you consider to be the main researchable question arising from this contextual variable?

ii. The method: How would you research it?

7. Research will be in a context in which the characteristics, attitudes and issues concerning faculty (teachers) will be important.

University teachers, school teachers and corporate trainers, (referred to here as “faculty”) have taken to distance education via the Web in ways they never did with older technologies. However their general expectation is to maintain teaching roles and curriculum ownership that is not too different from the traditional. The expectation of most of their institutions is also to keep things more or less as they are, by developing on-line versions of their existing courses to reach the learners who prefer the distance mode of delivery.

Among faculty and administrators there is general support for the idea that if online courses are taught their evaluation should be part of the faculty reward system. Many studies of faculty lead to the call for training in on-line teaching methods, and for support of various kinds, such as the use of mentors for junior faculty.

What is offered in the way of training for distance teaching varies from large-scale faculty development projects to self-taught individual learning. The type of course delivery techniques also varies significantly.

As identified by the College of Dupage in 1998 (Slocum & Hallongre, 1998) top issues in regard to the impact of the new technologies and distance education on faculty were: Intellectual Property Rights, Faculty Workload, and defining the responsibilities and
compensation for the maintenance of courses offered at a distance. To further review the impact of these top issues the College of Dupage set up a special Emerging Technologies Committee to review a number of concerns related to distance education. Some of these were:
- Program Approval
- Academic Freedom
- Intellectual Property Rights
- Assignment of Faculty
- Duties of Teaching Faculty
- Summer Assignments
- Marketing of Instructional Materials
- Large Group Classes Policy
- Instructional Design Agreements

A number of critics have arisen in US (e.g. David Noble and Jack Simmons) who today are organizing the professorate in labor actions against the kind of changes involved in the application of industrial principles to teaching university courses.

For on-line discussion:

i. The Question: what do you consider to be the main researchable question arising from this contextual variable?

ii. The method: How would you research it?

8. Research will be in a context in which there will be major changes in who supplies distance education programs.

The least-regulated market, where the private sector has the greatest comparative advantage in providing “just-in-time” learning, is non-degree training and education, and it is here that “corporate universities” and independent providers are rapidly expanding their offerings. This is putting competitive pressure on traditional formal education institutions, some of which are responding by establishing their own for-profit affiliates.

There is a trend toward the development of consortia of distance learning providers. These increasingly are partnerships between publicly funded institutions and for-profit organizations. Programs may be carried out by higher education institutions in concert with corporations that provide content (e.g. Novell), corporations that provide virtual delivery systems (e.g. Caliber Learning Network), and corporations that provide both (e.g. IBM) (Marchese, 1998). In all these cases, course work and credits as we historically have understood them are offered at a distance. Such developments reflect the high fixed cost of developing world-class distance learning courses, the need to market learning to non-traditional clients, often in places not known to the providers.

For-profit providers are becoming relatively more important, especially in serving adult learners already in the labour force. II

The University of Phoenix, a commercial subsidiary of the Apollo Group, is currently the largest private university in the US, delivering business and other degree programs to 56,000 students at more than 70 “campus sites”.

The Western Governors University (WGU) is a private, non-profit, virtual institution, offering degree programs by distance learning. It is the first exclusively virtual university of the US, formed by the governors of 17 states and some business partners including Microsoft, Sun Systems, IBM, and AT&T. For a fee, it essentially “brokers” existing courses and training programs offered by colleges and universities in the western states of the US.

Corporate Universities

Many corporations have established their own corporate universities to meet the increased need for ‘just-in-time’ and “just-enough” education. By the most recent count of their informal association, the Corporate University Xchange, there are over 1000 such entities, all but a handful (e.g. the Tennessee Valley Authority University) being private. Some of these corporate universities, like Motorola University, have built physical facilities globally to meet employee-training needs while some such as Dell University only exist virtually and have no campuses at all. The new profit-making private sector providers are unencumbered by many of the restrictions placed on management in both public and private non-profit educational institutions. Most for-profit providers are free of the fixed costs of dormitories, classrooms, grounds, sports facilities, and many other costs other than those of direct academic, technical, and administrative support and the minimum physical infrastructure necessary to house the providers of these services.

Education Companies

Some new companies are being established for the purpose of selling educational services online. For example, eCollege is a company founded in 1996 as Real Education in Denver, and is comprised of educators and technologists, and partners with University of Colorado and other five universities to deliver course content online. ECollege also worked with Microsoft to deliver online Microsoft 2000 productivity courses for faculty members. In December 1999, eCollege signed agreements covering 25 new colleges, universities and other educational institutions to develop online education. The "100 Degrees Online Grant Program" is eCollege's effort to increase the availability of complete online degree and certificates. There are some other companies, such as, Hartcourt, Hungryminds, Smartplanet, eHigherEducation and large multi-national for-profits such as Global Knowledge, and Suntek Information Systems in Korea. Hartcourt company says it has moved to become more a learning company than simply being a publisher, by focusing its business on four key sets of customers, i.e. elementary and secondary students, parents and teachers, adults seeking higher education, professionals in science, medicine, and technology. The companies of eCollege and eHigherEducation have just announced a partnership to provide management and capital to colleges and universities to support their online programs.

SmartForce, another “e-learning” company (with 1999 sales of $198 million), provides on-line mentors to its on-line courses, a library of laboratory simulations, threaded discussion forums on particular vendor products or generic developments in the IT industry, and the chance to interact with guest speakers on a pay-per-view basis.

Certification and testing business.
There are three testing companies that play the major role. They are: Prometric (recently acquired from Sylvan Learning Systems by Thomson Corp. of Canada for $775 million cash), CatGlobal (a division of Houghton-Mifflin), and Virtual University Enterprises (VUE, a division of National Computer Systems). Prometric operates about 2500 testing centers in 140 countries. VUE has nearly 1500 locations, including 20 in Mexico, 28 in Russia, 23 in Brazil, 19 in South Africa, and 50 in China—among other places. CatGlobal offers wholly on-line computer-based testing from servers in 16 countries.

Some training partners have developed their own certification programs, but the certificates awarded, like those of community colleges and colleges, do not hold the same status as those granted by vendors and industry associations. Learning Tree International, for example, will dub you a “certified professional” in Cisco Router or Oracle7 Database Administrator on completion of course work (minimum of 22 days and $4500 for Cisco; 19-24 days and $4500 for Oracle) and passing allied examinations (Learning Tree, 1999). These certifications are recommended for 10 college credits by ACE’s Credit Service, but they don’t mean that you are certified by Cisco or Oracle.

Training in use of software

In addition to designing the curricula and writing the examination specifications, companies like Microsoft, Oracle, Novell, Cisco are all in the direct-provision business. According to Adelman (2000) Sun Microsystems’ Educational Services division, for example, offers over 200 courses in classroom, Web-based, and CD modes with no restrictions on who can register. “In Beijing, Buenos Aires, or Boston there is a Sun office with trained and certified employees who serve as instructors at either the office itself or rented locations.”
Content providers: Some providers are not in the direct provision business, but rather specialize in curriculum reconfigurations for on-line or CD-based instruction. As an example, NETg provides 700 on-line modules for NIH’s programs, including eight devoted to the background curriculum for Microsoft Certified Solutions Developer (MCSD) certification, 28 that will set you up for Cisco certification exams, over 100 co-developed with Oracle Education (the majority devoted to database administration), and an “Internet Masters Series” developed with Netscape. As a measure of expected volume of use, NIH bought 600 licenses for this collection, augmented by a circulating library of self-study guides.

For on-line discussion:

i. The Question: what do you consider to be the main researchable question arising from this contextual variable?

ii. The method: How would you research it?

9. Research will be in the context of some new but also some very old areas of criticism, such as:

i. What are the effects of market skimming by the private sector and can anything be done?

If the private sector makes the most effective use of web technologies and the division of labor needed to increase quality while reducing costs, and if this process affects the provision of even university education, the profitable “low hanging fruit” will be gobbled up by the private profit-making sector. This will leave the public and private non-profit institutions to grapple with the higher-cost learners, meaning the least advantaged who need close emotional and other support as well as content areas that may be socially and personally of great value but do not give immediate returns to investment in the form of increased wages. This may raise the average costs of teaching the rest of the population, lead to further deterioration of the culture and leave only the rich able to afford a residential college experience.

iii. Is on-line distance education really cost-effective?

The issue of cost effectiveness in internet based distance education has been addressed to some extent in the corporate sector but not the university. For example, Quantum Corporation found a significant decrease in the cost of training, and increase in the effectiveness of their program. Moreover, using satellite and Internet technology, the company can train one person on a need basis, at a convenient time and do it economically. A consortium, GATE (Government Alliance for Training and Education), reports that training time and costs have been reduced significantly by distance learning at the U.S. Department of Energy and Federal Aviation Administration. The U.S. Coast Guard has used multimedia for several training initiatives, resulting in significant annual savings due to less need for instructors (Training, February 1997).
Storage Technology (corporation) technicians who were once required to travel to a central location for four to 10 days of training now receive training through a localized multimedia system, saving $1.5 million over a three-year period (Journal of Interactive Instruction Development, Winter 1996).

There are as yet no really large-scale providers of university level on-line web-based learning, and as a consequence, little or no proof that the potential returns to scale in this approach in higher education can be realized. The potential decrease in unit costs – with quality, i.e. “doing it right” – depends on reaching large markets over which to defray the higher fixed costs of course preparation and delivery, together with the substitution of high-priced labor by either lower unit cost technology or cheaper substitutes for traditional academic teaching personnel. These returns to scale are only beginning to be realized in a few programs, and in the corporate training market. Research shows that the up-front costs of preparing an online course, even if done by the professor teaching it with the help of a good “learning environment” software or service provider, are higher than for traditional courses. And so is the amount of interaction with students via email and chat groups. Only when the market is large and/or the interaction can be in part automated or conducted by lower cost professionals than world-class “star” professors and professional instructional designers, is cost-saving possible.

iii. How can intellectual property rights be protected?

At least two kinds of issues arise. The first has to do with the ownership of “courses” – are they the property of the professor or of the institution where he/she works? The second has to do with materials available on line in digital libraries or their equivalents. This is an old issue of copyright in the latter case, translated into the digital age where the cost of reproduction and transmission are virtually zero. For the course ownership, the question is more one of labour relations – which may be quite different when the professor is no longer a jack of all trades, but one member of a team, the subject matter expert (and possibly the lecturer for live and/or recorded audio and/or video).

iv. What does on-line education do to cultural diversity?

A major area of criticism is that the development of web-based learning systems will make cultural diversity one of the first victims of globalization in distance learning and perhaps cultural decay a second. This is because of the huge potential for reaping returns to scale, and the head start that English-speaking countries (especially the United States) have in ownership of the technology in this field. The precedents – e.g. the spread of Disney by television and films – worry many educators. Against these forces for homogenization and lowering standards are arrayed several opposing forces: the tenacity of cultural affiliation of many groups and countries, the just-over-the-horizon potential for high-quality automatic translation (which will weaken the advantages of English-speaking countries), and the trend for developing individualized instruction through the use of intelligent agents, artificial intelligence programs, and the like. These factors together make it
possible to tailor instruction to each individual’s language and learning style, the latter in part culturally determined.

v. Is there a Gresham’s law of web-based learning – the bad drives out the good?
Another criticism is that cheap but bad educational products will drive out good but more expensive ones if market forces prevail in the area of distance learning. Against this one can argue that as in other markets, institutions to assess quality are likely to arise, and that there will always be buyers ready to pay more for a superior product. The example of television is again a sobering one.

vi. What about drop-out rates?
These are said to be higher for distance education than for face-to-face education. This may be difficult to evaluate because of the difficulty of defining a dropout in conventional education, where dropping a course and substituting another is not reported as a “drop-out”. However, research and experience show that there are ways to lower drop-out rates, and these include developing active participation and interaction among participants in the learning process. This can be done in a variety of ways – development of study groups (facilitated or not), joint exercises by groups of students, direct interaction at a distance between teachers and learners (which can be expensive, but there are always the possibilities of substituting automated or semi-automated interaction for live interaction, using the electronic equivalent of teaching assistants to carry out the majority of the teacher-learner interactions, etc.), and the like.

vii. Problem of social isolation. If learners are alone at their computers (at work, at home, in libraries, or in learning centers) interacting with a computer, there are a number of social skills which can be acquired in F2F learning environments that may be more difficult or impossible to achieve. On the other hand, research shows that students of a reflective cognitive style as compared with the impulsive, i.e. normally reserved students, are more likely to participate actively when they can think about what they want to say for some time before interacting asynchronously (harder in a live class, which is more delimited in time), and when they do not need to worry about “how they look”. Facilitators can and are being hired and trained to encourage, stimulate and support on-line interaction between students. The issue is less serious for training people already in the labor force, assuming they are in organized work settings where F2F interaction is commonplace.

For on-line discussion:

i. The Question: what do you consider to be the main researchable question arising from this contextual variable?

ii. The method: How would you research it?

10: FINALLY: WHAT WILL BE PRIORITY AREAS FOR RESEARCH?
In this fast-moving field, research is needed on virtually everything. With on-line, web-based teaching and learning barely five years old, and subject to almost daily change, and given the conceptual confusion referred to earlier, it is no wonder that so little solid comparative research is available. On the other hand, many of the questions to be addressed are not technology specific so that much of the research on earlier forms of distance learning can be applied to web-based learning. What, then, might we suggest as priorities for research in the next few years? Here are some first thoughts.

1. **Can the enormous potential for increasing quality while at the same time reducing costs actually be realized?** While the numbers of on-line courses grow by thousands each year, there is little data on the total number of students taught and per unit costs for really large numbers of students (in the tens of thousands, hundreds of thousands, or even millions) taking the same course. Data for courses with tens or hundreds of students are unlikely to show significant cost savings or advances in quality. Perhaps in the corporate training world we will find the first good data for research on this question. Then it will be necessary to get access to such data.

2. **How can the obstacles to development of effective cheap and high-quality web-based learning be reduced or eliminated without incurring significant losses in academic freedom, intellectual rigor, and harder-to-measure non-economic and social interaction skills development?**

3. **How can the development of content be globalized so that peoples of more developed countries learn more from the peoples of other countries and cultures, in line with the development of global markets for learning?**

4. **There is a severe need for quality control.** Can learning portals and certification boards provide an effective quality certification, or will third party assessment of learning outcomes be more effective? Who would provide these? Are there other options?

5. **Basic research questions.** There is a wide range of basic research questions, such as: what learning objectives are better achieved by text, by audio, by video? What learner characteristics predict achievement by different teaching strategies? What are the optimum ways of achieving effective interactions and what kinds of interactions lead to academic achievement? How is on-line learning best evaluated? How is content best structured?

6. **How can this necessary research be implemented?** Incrementalism and a free-market approach may not be appropriate here. A better approach may be for a philanthropic organization, or a national education department to sponsor a single large-scale project in which all that is known about quality distance education could be brought to bear in the design and delivery of even a single course to a large national, or even global audience, with careful monitoring and evaluation. Web-based distance education needs and deserves a Manhattan project approach, a “put-a-man-on-the-moon” vision and approach. This will require political vision and leadership at the highest levels.
For on-line discussion:

i. The Question: what do you consider to be the most important researchable question arising from all these contextual variables?

ii. The method: How would you research it?

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1 The conclusions, or rather hypotheses presented in this paper are derived from a data base of literature, web-sites and a selection of on-line courses constructed as part of an on-going project investigating the current condition of information, communication and computer based learning. My partners in that project are Drs. Peter Knight and Sandi de Levante and I acknowledge their assistance, particularly that of Dr. Knight. This version is my responsibility.