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Internet: Present and Future Role in Higher Education

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ABSTRACT

This paper presents an overview of some of the current trends and thoughts concerning the role of the Internet in higher education. A number of institutional models of virtual universities, i.e., a university without a specific campus where students attend courses in person, are briefly described, and examples are presented. Since students attending classes on a campus is quite different from students studying via Internet-linked computers, some of the aspects involving the impact of the medium on the dynamics and psychology of online interactions are discussed and summarized. In regard to the actual learning taking place, a modified version of conventional education theory that can describe the learning process involved in a virtual classroom is defined and discussed.

Keywords: *alternative education, distance learning, Internet communication, online education, open university, virtual university*

INTRODUCTION

The 20th century saw revolutions sweep the politics and cultures of the world, and education was not exempt. The democratization of universities through mass education has not abated or even been limited to democratically inclined nations. Indeed, the pressure to further widen access to postsecondary education is increasing worldwide in this

new century.   The necessity of meeting this demand while facing the reality of limited resources is forcing politicians and educators to seek alternative solutions.   This paper presents brief overviews of several institutional models (Mason, 2001) that more or less innovatively provide expanded access to higher education.   In addition, some theories concerning the effects of the Internet medium and the education and learning environments are briefly presented.

INSTITUTIONAL MODELS

This paper groups distance learning institutional models into two types: those involving a group of institutions and those implemented within one.   For obvious reasons, group models have potentially the largest enrollments: brokerage, umbrella, partnership, and network models.   The brokerage and umbrella models are the most similar, both having a newly created organization coordinating the activities of the group, but the underlying philosophies are quite different: the brokerage model being top-down oriented and the umbrella being bottom-up.   The partnership model can have an egalitarian relationship among collaborating institutions, but the primary example, the United Kingdom (UK) Open University (OU), does not.   The network model plays a relatively minor role by not being particularly widely used or innovative.   The single-institution models, greenfield and dual-mode, hold a great deal of promise, as attested by the growth in number of institutions and popularity with working students.

Brokerage model

In the brokerage model, a small new organization is created to provide specific courses primarily aimed at the adult education sector,

i.e., mainly working students. The permanent staff can be kept small because it functions chiefly to bring students and providers together, the providers being established universities. Although learning centers may be setup, the courses are usually delivered directly to the student, including online, i.e., via the Internet.

Advantages

- low start-up cost by using the existing resources of established institutions
- central organization provides the partnering institutions with information about what types of education are currently in demand

Problems

- ownership of the courses offered
- institutional loyalties of course providers
- lack of public recognition and prestige
- making money

Open Learning Agency, Australia

The Open Learning Agency (OLA) (http://www.ola.edu.au/), founded in 1991 as a private institution initially funded by the Commonwealth of Australia, unites over 30 universities across the country by requesting specific courses for programs that OLA develops. It ambitiously attempts to provide all Australians with access to higher education anytime and anywhere at reasonable cost. It has grown from being the Television Open Learning Project to include online learning. In addition, it has brought innovation to Australia's higher education by being the first to offer four study periods a year and a *no entry requirements*

policy that excludes no one.   All participating universities are required
to provide transfer credits for courses taken through OLA, and when
students finish the qualifications for an OLA degree from a participat-
ing institution, they receive one that is identical to ones given to
on-campus students.   In addition, students can obtain free advice from
the OLA Student Advisors and support staff at these institutions along
with the support and assessment of their regular tutors.   Even a
distance library service is provided online.

University for Industry, UK

The recently created University for Industry (Ufi) (http://www.
ufiltd.co.uk/) in the UK offers 80% of its courses online (www.learndir-
ect.co.uk).   Although independent, the government is its major stake-
holder.   After an initial nationwide pilot study, the full network offi-
cially opened in October 2000 and now offers about 800 courses.   These
courses are bought from corporations as well as educational institu-
tions.   About 1300 *learndirect* e-learning centers have been setup in
England, Wales, and Northern Ireland in convenient locations in local
communities to allow students to enroll and obtain Internet access if
they lack one at home.   The Ufi partners operating these centers, or
Ufi hubs, are typically business organizations and potential employers,
public and private education institutions, local authorities, sports and
community organizations, libraries, and trades unions.   For a nominal
monthly fee, anyone can obtain an interactive, multimedia careers
information and advice package called *learndirect futures* from their
website.   Ufi has clearly proved popular with its almost 200,000 stu-
dents, 90% of whom have expressed enough satisfaction to be able to
recommend it to their friends.

Umbrella model

Here, as with the brokerage model, existing institutions, usually relatively small, join together in order to provide new and old courses in new ways under a unifying thin organization in an effort to gain synergy through cooperation.

Advantages

- offers the advantages of the brokerage model with the added one of having the initiative originating from the collaborators themselves

    Since the incentive driving the original participants is one of survival and growth in a quickly changing and increasingly competitive environment, this helps overcome the usually negative pressures of institutional politics, market protection and collaboration hostilities.

Problems

- difficulty of building consensus among usually independent institutions

    This can only be accomplished by far-sighted and determined political will acting under harsh economic realities.

University of the Highlands and Islands, Scotland

A good example is the University of the Highlands and Islands (UHI), Scotland, a decentralized federation of eleven colleges and two research institutions scattered across the region: founded 1996 and opened 1998 (www.uhi.ac.uk). The University was established along with community outreach centers in order to help promote regional economic and social development of the dispersed and primarily rural

population. Each participating institution remains autonomous; however, their representatives on the Network Academic Council provide academic planning, curriculum development and oversight. The University Management Group provides overall coordination and development administration among the affiliated institutions. The Board of Directors oversees the UHI system and provides community input; five of its fifteen members are elected by the UHI Foundation, which represents local businesses and communities. An executive office staff of only 14 supports these groups and interacts with the world outside UHI.

The mission statement of UHI emphasizes efforts to

◎ widen access to high quality tertiary education

◎ increase participation rates through new approaches to learning and teaching making the most of the new information and communication technologies

◎ develop an indigenous research and development infrastructure

◎ support the region's unique cultural and environmental heritage

◎ act as a major catalyst for economic and social regeneration

(www.uhi.ac.uk/scot_proj.html)

The UHI implementation of the umbrella model is viewed as a way of maximizing the use of limited resources in regions of the world that lack a tradition of locally-oriented higher education. An example is the opinion below from the Association for the Development of Education in Africa (ADEA) online newsletter.

Is UHI really a prototype university for the 21st century? Very likely. It ... clearly challenges the prevailing worldwide university model. Notably, it ... [anticipates] many of the recommendations

contained in recent higher education assessments by the Dearing Commission (UK), the Delors Commission (UNESCO), the OECD Thematic Review of Tertiary Education, the Netherlands Scientific Council Report to Government on Higher Education, the New Zealand Green Paper on Future Tertiary Education Policy, and the South African National Commission on Higher Education. ... If UHI doesn't foreshadow the future of higher education, it certainly represents a bold transitional step in that direction.

(www.adeanet.org/newsletter/Vol11No1/en_9.html)

UHI Technology

The UHI Wide-Area Network (WAN) is a data network connecting twenty-six locations dispersed in a region bounded by Perth, Shetland, Elgin and Stornoway (Scotland) using a private provider that can deliver a multi-megabit service.

The UHI WAN supports a range of complementary capabilities:

- data networking at sites through a Local-Area Network (LAN)
- integrated telephony systems at all sites allowing internal voice and ISDN videoconferencing calls across the network without cost
- internal broadcasting services, including TV and radio channels

UHI's networked courses are available in a number of locations at the same time. Students from several different locations can come together for a videoconference seminar via the WAN or hold an online discussion about a subject using the Internet. Tutors can be in daily contact with their students via the Internet, wherever they are. Most courses offer personal face-to-face teaching as well as videoconference access. In addition, UHI is currently working to deliver online, free-standing modules and full UHI courses over the Internet.

In short, this use of data networks, both the UHI WAN and the Internet, provides various Intranet functions, including online teaching materials, learning resources, and integration of management and administration systems as well as offsite communication with students.

Western Governors University, USA

The members of the Western Governors Association (WGA) (www. westgov.org), an organization of the governors of 18 western states in the US, two Pacific-flag territories and one commonwealth, initially conceived of a virtual university in order to save money by eliminating duplication through jointly developing and delivering distance learning programs. With decreasing state budgets and increasing student enrollment, the governors realized that traditional colleges and universities would be inadequate to cope with the demands of a changing economy and society. Thus, the group decided that a joint educational venture among already existing institutions working in conjunction with commercial enterprises would be better able to deliver education to a wider audience using IT (Information Technology), including the Internet.

Initial planning was begun in 1995; the plan for the Western Governors University (WGU) (www.wgu.edu) was unanimously endorsed at the WGA meeting in June 1996 by the 10 governors present: Arizona, Colorado, Idaho, Nebraska, New Mexico, North Dakota, Oregon, Utah, Washington and Wyoming. The first 10 states were later joined by Alaska, Hawaii, Montana, Nevada, Oklahoma, Texas, Indiana, and the territory of Guam. In addition, preliminary collaboration agreements were reached with the Open University, UK; the Open Learning Agency, British Columbia, Canada; the Tokai University Educational System, Japan; and the Universidad Virtual del Instituto

Tecnologico y de Estudios Superiores de Monterrey (ITESM), Mexico, in 1997. Eventually, the first three degree and certificate programs were opened to students in 1998. The Accrediting Commission of the Distance Education and Training Council (DETC) (www.detc.org/content/whatis.html) granted accreditation to WGU on June 6, 2001.

WGU's mission

The goal of WGU (www.wgu.edu/wgu/about/vision_history.html) is to serve the present needs of citizens. Consequently, its mission is to provide easy access to affordable, practical education that is not limited to academic degrees. WGU provides high-quality, demand driven accessible education through the use of the Internet, videoconferencing and other methods in order to overcome barriers of time and distance. Since WGU is a collaborative venture of many educational institutions from academic to corporate, it can offer its member institutions' courses as well as its own courses, degrees, and certifications.

Central to the functioning of WGU is the Internet-based master catalog that brings together a listing of the courses and programs available from its members. More importantly, the catalog details the skills necessary to obtain competency-based WBU certifications as well as allows students to self-assess their existing skills and knowledge in order to plan their education. Then students can create a personal profile including this information along with their available time for taking courses; the catalog uses this personal information to suggest suitable educational options. In addition, the catalog provides job and career information. Besides the catalog, online services like a library, a bookstore, and advising services are available

Although WBU is a virtual university, all the collaborating states are required to maintain at least one center where WBU services are

available, including public access to the course delivery technology: e. g., computers, audio and video classrooms and Internet connections. Additionally, the centers offer counseling and conduct competency assessments.

Partnership model

Existing institutions in this model become partners to share existing courses that are offered with or without modifications. The partnerships may involve both providing and receiving courses on a relatively equal basis among the partners, two-way partnerships, or they may be one of a senior institution, e.g., large and/or prestigious and well established, providing assistance to smaller or less well endowed institutions.

Advantages

- the prestige and public recognition of the stronger institution helps establish and develop the partner institutions
- increases utility of previously developed course materials by broadening the available student audience

Problems

- domination of smaller institutions by a senior partner results in the loss of cultural perspective
- lack of reciprocity

Open University, United Kingdom

The most widely known example of the partnership model is the UK Open University (OU), established by Royal Charter in 1969 (www. open.ac.uk). Through its partnering institutions, it offers more than

360 university courses to 140,000 undergraduate and 45,000 graduate students located across the UK, Europe, Africa, Asia, the Middle East, and North America (20,000 students outside the UK) as well as providing non-degree courses for adult education. At present, most of the courses rely on the more traditional print, audio and video tape, and broadcast media, but more than 150 OU courses feature some form of IT; about 110,000 students use the Internet for online conferencing and email. In fact, 14 courses are entirely online, i.e., delivered by the Internet. Since most of the students study part time (70% employed full time), an undergraduate degree usually takes six years to complete. Being an open university, there are no entrance requirements, other than being 18 years old, for an undergraduate degree program. Even though over one third of the students enter with qualifications lower than at traditional universities, around 70% complete their courses each year.

OU: new technology

UK OU continues to invest in the development IT teaching aids. An example of this is INSTILL - Integrating New Systems and Technologies into Lifelong Learning - a £10 million investment over five years, which in turn has resulted in the creation of the Knowledge Media Institute (KMi). KMi is currently conducting research in a number of technologies: Internet-enhanced collaboration media, multimedia environments for disabled learners, intelligent agents, organizational memories, digital documents, scientific visualization and simulation tools, etc. In addition, the OU PALACES (Public, Associate Lecturers, Alumni Customers, Enquirers, Students) program is greatly changing the interaction among students, University and educators by putting it online via the OU website: for example, administra-

tion functions such as registration for courses, schools and examinations; access to personal and academic information; and publication of study calendars, handbooks, and assignment guides. In addition, OU students can submit written assignments online by either the webpage or email. After being checked by the instructor using special marking software, the student work is returned to the University via the web interface; the University system automatically records the scores on the student's record and returns the marked work via the Internet. (www3.open.ac.uk/media/factsheets/NewTech.pdf)

Network model

Compared to the other models described, the network model is the least structured because there is no central or organizing authority. It is a loose collaboration of existing universities and other education providers in a variety of combinations arising from existing relationships.

Advantages
- tends to have less conflict of interest since it has grown out of existing working relationships

Problems
- no central authority or overriding vision
- not innovative, providing only incremental advances to its affiliated institutions

Virtual University for Europe

EuroPACE 200 (www.europace.be) is a trans-European network of universities and a variety of educational and training institutions

encompassing private enterprises, regional and other public authorities, and professional organizations. It was chartered in Belgium to develop partnerships to produce ODL (Open and Distance Learning) joint-courses delivered by ISDN videoconferencing. The entire organization consists of approximately 60 members (45 universities), but the actual members collaborating on any particular joint-course project depends on the needs of the individual institutions.

Greenfield model

The greenfield model bypasses the difficulties of attempting to graft new technologies, procedures and, indeed, paradigms onto an existing organization (or organizations) by establishing an entirely new enterprise. The increasing number of such private institutions springing up on the Internet demonstrates the attractiveness of this proposition.

Advantages

- can focus on the delivery of a curriculum targeting students with a pressing need using methods best suited for distance learning
- free to concentrate on delivering highly focussed, quality teaching because there is no need to promote research
- able to freely use new technologies for management and administration

Problems

- considerable financial risk and effort required to gather management, instructors, and technical staff
- initial lack of credibility

Magellan University, USA

Magellan University (magellan.edu), founded in 1994 and opened in 1997, is a for-profit institution that specializes in distance learning IT and accounting certification training programs. Magellan contracts with instructors from around the world for specific courses and provides support with an online tutor for about every 15 students in a course. These tutors, paid per student, interact asynchronously with them and mark their assignments. As of mid-2000, Magellan had 1000 students in several countries studying 40 online courses with 15 instructors (Christian Science Monitor Online Edition, 2000).

Dual Mode model

Simply put, dual mode implies a student having the option of taking courses online or in a classroom on a *real* campus. The perceived advantages of this model have led to its wide acceptance in universities in the UK, Australia, Canada and the US: approximately 80% offering distance learning in at least one program of study. As this model evolves, multi-mode might be a better term because traditional campus-based education has been adapting itself by offering evening, weekend, and short, intensive courses for adult continuing education (Davies and Stacey, 1998).

Advantages

- potential of delivering a wider range of subjects than most strictly virtual institutions
- availability of permanent facilities increases possibilities: e.g., mixed print and video lectures, on-campus classes with print during evenings or special short periods, online conferencing, and direct on-campus resource access or by the Internet

- allows online students the option of attending courses on campus, either in regular classes or in special intensive, short-term sessions
- courses taught by the institution's regular staff would increase credibility of online education

Problems

- inevitable problems with overlaying an online presence onto a well-established hierarchy
- extra effort involved in the administration and maintenance of two very different modes of delivery
- need to develop equity between modes in order to maintain academic and administrative integrity

University of Phoenix, USA

The University of Phoenix is the largest accredited private university in the US with 107 campuses and learning centers across the country: founded in 1976 with University of Phoenix Online founded in 1989 (www.phoenix.edu). The University is uniquely oriented towards working adults; students must be at least 23 years old and either employed or with access to a situation that allows the application of knowledge gained in the courses. It offers bachelor's, master's and doctoral degrees as well as professional certificate programs: Business, Management, Technology Management, Information Systems, Education, and Nursing. University of Phoenix Online offers complete degree programs. Except for a doctoral degree, which requires a few weeks of residency, all of the curriculum can be completed via the Internet. In addition, all administrative procedures including registration and book purchases can be completed online. Another unique feature is the sequencing of the courses, which are 5-6 weeks long and

taken one at a time. The use of an asynchronous format similar to e-mail allows students to participate at convenient times and places. Probably one of the most attractive features for working students is the fact that most of them can complete their degree in just two or three years.

STUDIES OF ONLINE LEARNING

Concerning the effectiveness of online education, a recently published report reviewing the literature comparing online with in-class education came to the following conclusion:"With few exceptions, the bulk of these writings suggests that the learning outcomes of students using technology at a distance are similar to the learning outcomes of students who participate in conventional classroom instruction." Although the authors cautioned that the studies and, therefore, the conclusions about online learning are questionable, they went on to write that,"... many of the results seem to indicate that technology is not nearly as important as other factors, such as learning tasks, learner characteristics, student motivation, and the instructor," (Phipps and Merisotis, 1999) - factors that can be addressed through theories of education and learning environments.

EDUCATION THEORY

Since education is more art than science, a number of education theories exist. It is probably useful to discuss some of these theories, namely, cognitive, constructive, and situated learning, relative to online learning:

- for cognitivists, learning occurs when individuals use their cognitive abilities to acquire information, seek meaning through context, and convert it into knowledge through understanding,
- for constructivists, learners can best acquire knowledge by being involved in activities designed to elicit the construction of personal meanings for information through understanding, and
- for situated learner advocates, the wider social contexts, i.e., communities of practice (Lave and Wenger, 1993), of what is to be learned are important for acquisition to take place.

Of course, these views of education are not wholly mutually exclusive; in fact, their special emphases can be useful for describing the various stages of learning as well as for different learning situations (Hammond & Trapp, 2000).

Rumelhart and Norman (1978) simplified the learning process into three stages that learners cycle through in the acquisition of knowledge.

- Accretion: the acquisition of new information by factual retention within pre-existing schemata
- Structuring: the construction of meaning by personalizing the acquired information through the construction of new definitions and links, i.e., the formation of new schemata.
- Tuning: the adjustment of the acquired knowledge for the desired use through internal and/or external dialog.

These three stages exist within, i.e., are influenced by, the wider context of a community of practice: in this case, an online course. In this context, the new information in the accretion stage can come from various sources such as books or online. This information can be

structured, i.e., personal meaning constructed, by any number of activities that range from self-directed to the more traditional instructor-required assignments. By the tuning stage, learners should be able to articulate and evaluate knowledge that they have gained; tuning involves adjusting ones own schemata in order to accommodate new knowledge as well as making adjustments to the new knowledge as a result of interacting with others. The activities involved in the tuning and structuring stages should result in new questions that would naturally lead back to the initial, accretion, stage to close the cycle.

LEARNING ENVIRONMENTS

Since the community of practice mentioned above globally influences student learning, some mention should be made of D. W. Johnson's (1979) three types of behavior settings, or goal structures: *cooperative, competitive,* and *individualistic*.

Cooperative goal structures are characterized by individuals who work on tasks as a group, helping the others to be rewarded. This altruistic behavior is a result of several factors; most importantly, rewards are determined by the outcome of the group task according to fixed standards, i.e., criterion-referenced. This collaborative environment features positive interdependence. Other important characteristics of *cooperative goal structures* are high levels of intra-group interactivity (including processing) and personal responsibility as well as heterogeneous groupings. Mixed groups tend to develop a tolerant atmosphere that is conducive to cooperation.

With *competitive goal structures,* students are given tasks that are accomplished and evaluated individually. The evaluations of individual performance are competitive by being based on a normal distribu-

tion, i.e., norm-referenced. Thus, students achieve their goals primarily at the expense of others; any cooperative behavior can be viewed as detrimental.

Similar to *competitive goal structures*, students are given individual goals, but with *individual goal structures*, their individual efforts are evaluated using a criterion-referenced system. While interactivity and interdependence are not considered disadvantageous as with *competitive goal structures*, cooperation is not the norm. Since students in Japanese universities are typically graded for individual effort and instructors are provided with grading guidelines that are set to specific and absolute performance criteria, the course environment would fit into this category.

If crafted carefully, online education can have all the characteristics of a *cooperative goal structured* environment (Sherman, 2000). For example, asynchronous communication can permit intra-group interactivity although individuals have disparate schedules, and documentation provided by the enduring and openly available online transcript could encourage individual accountability. A high level of interactivity resulting from the shared responsibility for a group activity could increase the likelihood of a high level of processing. Because online education need not be geographically or access restrictive (for people with some disability), heterogeneous groups can be the norm. In fact, open education can, in reality, be limitless.

DYNAMICS AND PSYCHOLOGY OF MEDIA

Various aspects of online education from institutional models to theories of education and learning environment have been presented, but the impact of the medium itself should also be discussed. While it

has been commonly accepted that understanding the meaning of words requires knowledge of the context in which they are used, it took Marshall McLuhan (1964) to elucidate how the medium of communication can also affect the understanding. For example, as a communication medium, the telephone has continued to be essentially irresistible because it carries the promise of human interactivity in a somewhat ambiguous environment that results from a relatively poor sound quality; i.e., the lack of information is compensated by imagination. With the advent of the Internet, online *chats*, synchronous written conversations, have become telephone conversation's written equivalent with very important differences, namely, the ability to mask identity and emotional state: the result? Lowering of inhibitions (Levinson, 1999). While participants in online education must have some knowledge of each other, it is, by nature, limited to the content and context of their on-going written interaction.

Written material, text, like the conversations above, can also be considered content that can be delivered by various media. Any non-online recording medium, e.g., stone, paper, and CD-ROM, is open to individual interpretation, but it is essentially one-way communication because it is not very open to interactivity.

> Socrates..., worrying in the *Phaedrus* that the written transcript, unlike verbal dialogue, provides but one unvarying answer to its questioners.... yearned for "an intelligent writing which... can defend itself, and knows when to speak and when to be silent" (Plato's *Phaedrus*, secs 275-6, see Levinson, 1999)

As if in response to Socrates, the computer scientists using ARPANET (Advanced Research Projects Agency Network, opera-

tional in 1969), the precursor to the Internet, soon realized that,"... assisting human communication was the most fundamental advance that the ARPANET made possible": its most useful function being asynchronous written communication (www.dei.isep.ipp.pt/docs/arpa-- 1.html). Later, in the early 80s, the Western Behavioral Sciences Institute found that online seminars were often more productive than in-person meetings because of several factors: 1) asynchronous conver- sations with a response time of minutes, hours or, rarely, several days were ideal for intellectual dialog because this time allowed for a more considered response; 2) the entire dialog could be archived; and 3) participants were not limited by distance (Levinson, 1999).

DISCUSSION AND CONCLUSIONS

The theories of education and learning environments and the nature of online communication presented in this report show that learning online is clearly possible, and it can be the equal of or better than traditional university education. In reality, online education is starting to show itself to be a middle path between traditional on- campus and by-mail distance learning, both of which have inherent limitations. In-person dialog is limited to only one person speaking at any one time and is, by nature, emotionally charged; interactions that occur in a classroom setting, therefore, may be *real time* but inhibited by the emotional presence of others. With by-mail distance learning, the time required for traditional mail correspondence can clearly inhibit lively interaction as well as prevent group activities. In fact, online asynchronous communication opens the possibility of having multiple dialog threads running simultaneously, allowing group interaction in a number of combinations along with a one-on-one dialog with the

instructor. The latter is reminiscent of what used to be a basic characteristic of universities before the advent of mass education, namely, a tutorial system. In addition, whether tutorial or mass, education that requires in-person attendance clearly presents a geographic limitation on students; no such limits exist for online education, which can be global in reach.

The worldwide, pressing need for expanded access to higher education in an environment of limited resources has resulted in the growing presence of online education delivered by various types of institutions. Considering that this field is in its infancy with barely 10 years of existence, it is impossible to predict what will happen besides online education having a commanding presence in the not-to-distant future.

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