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THE REALITIES OF THE VIRTUAL UNIVERSITY

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Abstract

The concept of the virtual university is a significant strategic issue for the management of higher education. Faced with a number of fiscal and market challenges universities see an opportunity to apply information and communication technologies (ICT) to help meet these challenges. However, serious barriers remain in realizing this opportunity. These barriers are a result of (1) a failure to recognize how these technologies alter the traditional role of faculty and (2) a lack of empirical assessment of the impact of ICT initiatives on learning outcomes. New processes and organizational forms based on the concept of shared domain knowledge are proposed as an approach to overcoming these barriers.

Keywords: Virtual higher education, impact of information and communication initiatives

Forces Impacting Higher Education

Three primary forces are providing momentum for the focus on the potential of the virtual university.

- The price of a college degree grew consistently above the average level of inflation. Since 1980, the dollar cost for tuition of all types of institutions *doubled*, making education costs rise faster than the cost of virtually all other consumer goods. (Losco and Fife, 2000)
- A growing number of jobs require post-secondary education yet more and more students cannot afford escalating tuitions.
- The National Survey of Information Technology in Higher Education reports that, despite escalating costs for technology, less than a third of institutions reported having a financial plan for financing information technology. (Losco and Fife, 2000)

The Evolution of ICT in Higher Education

The continuing breakthroughs in information and communication technology (ICT) impacted higher education since the late 1950's. These developments drove university managements to make significant investments in emerging technology infrastructure to maintain competitive resources for student and faculty, but primarily to implement new administrative applications. In recent years, however, in addition to continual hardware and software spending, the personnel costs for providing technologists to support faculty development in academic applications have risen ever faster. (Green, 2001).

While the dominant role of ICT in higher education continues to be in support of traditional administrative applications, a few institutions moved quickly in the early 1960's to experiment with supporting emerging computer languages such as BASIC to provide faculty and students with an introduction to computer literacy. By the mid '70's many schools added some form of computer technology training as the opportunities for graduates with computer skills skyrocketed in the job market. This pattern of responding to "hands-on" training needs led to the proliferation of computer laboratories; support staffs; and a never-ending need to upgrade IT infrastructure in concert with industry developments. The emergence of the PC in the early '80's led to further infrastructure requirements. Finally the explosion of the Internet in the early 1990's required more upgrades to take advantage of the vast resources available on the World Wide Web.

U.S. Department of Education statistics report that over 54,000 on-line courses were being offered in 1998 with an anticipated growth rate of 20%. (Carnevale, 2000). These courses were primarily existing distance learning programs[1] converted to the Web interface. This Web initiative, however, presented far more challenges than previous stages of ICT implementations.

ICT and Learning Outcomes

As network technology providing "anytime, anywhere" computing emerged in the late 1980's, a small group of universities developed laboratories for evaluating the role of network applications on learning. For example, new groupware software tools were used to measure outcomes of collaborative learning among dispersed class members. (Morrissey, 1997) The results of this limited research suggested that certain learning tasks could be enhanced with students and instructors interacting in an asynchronous environment. The introduction of the Web, however, and its ubiquity immediately propelled universities to expand this "virtual classroom" model by accelerating their current distance education programs. Almost immediately new for-profit competitors such as Jones International University emerged on the scene.

Important supporting elements for a virtual learning environment were also being introduced. Document databases such as ProQuest and EBSCO became accessible through Internet access. The intense competition in laser printing technology led to low cost, desktop units providing the opportunity to deliver student's course materials on-demand. Text publishers moved to reevaluating traditional bookstore channels and increased some of their offerings on-line.

Finally, intense competition emerged in the telecommunications industry providing economical broadband technology allowing voice, data and video to be transmitted over a common pipe. These communication resources are now the newest investment challenge for university ICT infrastructures because they provide a more traditional "face-to-face" learning environment in formats such as "web-casting" that emulate the traditional synchronous classroom delivery mode. (www.webex.com)

The recent convergence of these technology developments led to a wide spread focus exhibited in a proliferation of articles and conferences on how these disruptive technologies will influence future university models. The emerging descriptor for this new form of delivering education on the web is the "virtual university".

Defining the Virtual University

A general consensus in the literature on this topic groups emerging virtual university models into three categories:

- Category A-an intra-university Intranet using information and communication technology within the traditional bricks and mortar structure. Little or no distance learning initiatives are apparent. Category A schools provide competitive Internet resources for a wide range of administrative applications; library access; and email, but are hesitant to expand their course offerings beyond the current student body. The extent of faculty use of new ICT tools in their own course delivery varies widely. This category primarily includes private institutions.

- Category B-These universities provide an "anytime, anywhere" virtual classroom model where ICT platforms support courses and degree programs for both resident and non-resident students. These initiatives are growing rapidly. (www.campuscomputing.net). Most of the leading initiatives are evolutions of traditional "distance education" programs - historically known as correspondence courses - that now extend the university's delivery system to the Web. In parallel, some schools that never participated in distance education previously are now experimenting with traditional classroom courses on the Internet. Many of these institutions outsource the delivery and support of these initiatives to commercial vendors such as e-College and Blackboard.

Three models representative of these Category B programs are described in Sidebar 1.

[1]For example, live television broadcasts of engineering classes was started in the 1960's, with such universities as Stanford, University of Southern California, and Southern Methodist University offering classes direct to company sites on a private network.

Sidebar 1
Examples of Anytime, Anywhere Programs

Penn State's World Campus (www.worldcampus.psu.edu)

Pennsylvania State University is probably the most comprehensive model of how universities that made a historical commitment to extending their resources to non-resident students through distance education programs, were able to migrate ICT platforms designed for distance learning into support for traditional classroom delivery. Starting in 1992, a program to leverage their extensive experience into the mainstream campus curriculum led to the "world campus' model in 1996. The implementation of World Campus also reflects the broad organizational changes required for a university to implement a virtual university program and the log-term commitment required. (Ryan and Miller, 2000)

Michigan Virtual University (www.mivu.org)

A contrasting strategy can be found in the Michigan Virtual University (MVU) model. (www.mivu.org). MVU was founded in 1998 by the state legislature to deliver online education to the Michigan workforce. MVU (www.mivu.org) is a cooperative effort between Michigan higher education and industry. It acts as a marketing and coordinating organization to offer courses through its higher education members. MVU does not grant degrees and contracts for delivery of its programs through Michigan universities. Its goals are to extend university resources to support workforce development and continuing education.

The Stanford Center for Professional Development (http://scpd.Stanford.edu/scpd/default.htm)

Stanford pioneered distance education engineering professionals utilizing closed circuit television in the mid-1960's and continues to utilize new learning technologies today Their program currently serves over 5000 students with many of their courses delivered on the Internet at no cost to the public.

Category C-a new university form that competes with the traditional university. Currently these models are primarily "for-profit", typified by Jones International University (www.jonesinternational.edu). These institutions grant degrees and are becoming accredited. They still lack the "branding" of a traditional university. It should be noted, however, that some traditional universities such as Cornell (www.ecornell.com) also perceive the "for-profit' model as an appropriate organizational form for these initiatives. Sidebar 2 discusses one such form.

Sidebar 2
Example of a New University Form

A pioneering experiment, NYU OnLine, launched in 1998, closed its doors in late 2001. During its three years of operation, NYU OnLine spent about $25 million, producing 7 courses and few enrollments (Chronicle of Higher Education, January 14, 2000.)

A number of related developments in the virtual university movement are described in Sidebar 3. As universities and libraries develop their own web-based resources there will be an acceleration of interchange among these resources among the academy and through co-ops such as that by NLII described in the sidebar.

Sidebar 3
Other Virtual University Developments

MIT's OpenCourseWare (http://web.mit.edu/ocw)

In April, 2001, MIT announced it would make MIT course materials used in teaching undergraduate and graduate subjects available on the web, free of charge, to any user, anywhere in the world. OCW is not a distance learning initiative. The first release of these materials is expected in September, 2002.

Digital Libraries Initiative (www.dli2.nsf.gov)

Phase 2 of this initiative was launched in 1998 by NSF to fund continuing research in enhancing digital library delivery systems. More specifically a new program in 2002 is intended "to advance the creation and access to internet-based digital content, regardless of location, information content or form". This development will provide faculty a rich base of content to incorporate into course materials.

California Digital Library (www.cdlib.org)

Founded in 1997, the California Digital Library Project is an additional "co-library" of the UC campuses, with a focus on digital materials and services. Several CDL projects focus on collaboration with other California universities "to create and extend access to digital materials to UC partners and to the public at large." This initiative will no doubt provide vast resources to stimulate life long learning programs.

National Learning Infrastructure Initiative (www.educause.edu/nlii)

This organization, launched in 1994, is a membership coalition sponsored by EDUCAUSE. Its mission is "to create new collegiate learning environments that harness the power of information technology to improve the quality of teaching and learning, contain or reduce rising costs, and provide greater access to American higher education".

Faculty Roles in the Virtual University

Despite the momentum and investment in these various virtual university models, recognition of how Internet course delivery conflicts with the nature of faculty work continues to inhibit its acceptance.

1. Faculty evaluations continue to be centered on published research. While faculty members find the Internet invaluable in supporting this effort in communicating and exchanging documents with colleagues around the world, they move slowly to embrace ICT as a new teaching tool. The literature contains few empirical studies assessing the learning outcomes of teaching with ICT augmented delivery. (Hiltz 1994, Alavi 1997, and Morrissey 1998). These studies show that instructional technology initiatives can be designed to enhance traditional learning models. Related support comes from scholars who provide detailed analyses of how traditional educational models can be translated to the ICT environment. (Leidner and Jarvenpaa 1995, Valcke 2001). This lack of published research on the learning impact of ICT reflects, in great part, the fact that faculty find no sense of urgency to develop courses that leverage this resource. Yet, university administrations continue to allocate a significant portion of their IT budgets to faculty support of computing.

2. This reluctance to employ new Internet resources is heightened by the complexity of course design. "The problem for the designers of a technology-based learning strategy is defining an instructional paradigm that is contextually appropriate and instructionally sound from this myriad of conceptual frameworks". (Rodenburg, 1999)

3. Faculty compensation issues and ownership of ‘‘courseware” are also barriers to course development. Difficult trade-offs must be made in allocating time among research and teaching to develop Web-based courses. Unlike the textbook model, faculty may not be compensated for their authored courses. In addition, the multiple platforms adopted by universities inhibits the broad distribution of the course to other schools. (Passmore, 2000)

4. Faculty relationships inhibit use of instructional technologies. Developing and offering a “virtual” course independent of one’s colleagues may put pressure on others to follow suit to ensure consistency in department curricula. Students in a “virtual classroom” are believed to require more of the instructor’s time. Technology failures are known to occur. Faculty believe that such failures reflect on their performance and the value of the course. Most important, traditional office hours give way to unlimited accessibility in this new environment. Faculty may be unwilling to adapt such a drastic change in the traditional work environment of the academy.

5. On-line courses still carry the connotation of a “correspondence” school. No doubt Category One universities are apprehensive about the impact on their reputation and, therefore, do not encourage faculty to embrace this new opportunity. However, broad-based distance education programs from leading schools such as Stanford and Penn State may slowly dilute this fear.

6. The perception of ICT as a productivity tool may conflict with faculty perceptions of their own value in society. The vision of a small, elite faculty serving thousands of students in a virtual delivery system is antithetical to faculty culture. It is also seen as an economic and intellectual threat. If a single faculty member can handle large groups of students, the number of faculty slots decrease and, over a relatively short time, the number of students undertaking PhD programs decreases drastically.

7. Reducing the number of faculty carries with it the unintended consequence that a new paradigm for funding research will need to be established. Since World War II, the enormous extent of the United States’ research activities resulted from the large number of faculty engaged in it. As the number of faculty is reduced, the extent of the research effort decreases. The country’s intellectual advantage could well disappear.

Bridging the Gap

The conflicts between the vision of the virtual university as a panacea for solving higher education challenges, and those of faculty, will require higher education administrators to recognize that productive faculty participation will require new organizational forms and planning processes to integrate ICT initiatives successfully. Rice and Miller (2001) suggest that these divergent views of the virtual university may only be resolved through extensive participation by faculty in the universities’ technology planning. However, their study does not address a recommended form for such faculty participation.

These challenges are not without precedent. Misalignment of ICT strategy with organizational structure is a dominant theme in the information systems literature. (Weill, 1998). Reich and Benbasat (2000) identify the nature of this conflict as a failure for organizations to ensure “the ability of IT and business executives, *at a deep level*, to understand and be able to participate in the others’ key processes and to respect each other’s unique contribution and challenges.”

This approach to sharing domain knowledge in the complex university environment will require faculty and technologists to create a coordinating mechanism that encourages each side to understand how their domain knowledge can leverage ICT to enhance learning. Unless they do, the virtual university will not become a reality.

We are still in the early stages of understanding the full impact of ICT developments on the future of the university. Traditional organizational approaches to implementing productive ICT applications, however, will only widen the current gap between the visions of university management and those of their faculty.

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