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EDITORIAL

As promised in the previous issue, DEOS will focus on computer-mediated communication (CMC) for a while. Several very valuable comments about CMC have already appeared in DEOS-L, and I hope we can continue the discussion. I encourage you to post comments and questions about CMC in DEOS-L. Greg Kearsley, Robin Mason, and this editor--the authors of the three latest DEOSNEWS issues--are willing to reply to comments and questions related to these CMC articles in DEOS-L.

By the way, do you believe that future electronic universities can handle mass education? I look forward to reading your comments in DEOS-L....

THE ELECTRONIC UNIVERSITY: COMPUTER CONFERENCING IN MASS EDUCATION

By Morten Flate Paulsen

INTRODUCTION

So far, courses taught via computer conferencing have enrolled relatively few students. Many courses have less than ten students, few more than fifty. Consequently, the experts question whether computer conferencing is suitable for mass education (Mason 1990, 31-38). We know, however, that computer conferencing systems can handle thousands of users. CompuServe claims in recent advertisements to have 800,000 users. Hence, computer conferencing systems can technically evolve to electronic universities capable of handling more students than can be served by large traditional universities. Technicians continually add new features to existing applications, and business managers usually seek to attract more customers to their services. This expansion could include the evolution of small electronic colleges into large electronic universities. But, of course, a crucial question is: What are the benefits of large electronic universities?

Some important benefits are the opportunities to increase efficiency by large scale operations, to coordinate research and development, and to bring university people together in a creative setting. Currently, we see too many scattered, fumbling experiments trying to reinvent the wheel of computer conferencing.

This paper will present some carefully chosen, interesting organizations and characterize their key attributes, and it will focus on the opportunities and problems that arise when an electronic university enrolls thousands of students. The intension is not to give a critical analysis of these organisations, but to extract features that can assist in building models for future electronic universities. It will be argued that an electronic university is a system:

- Serving thousands of users, as does CompuServe;
- Offering courses and programs from several colleges, as does Electronic University Network;
- Enrolling hundreds of students in a single course, such as DT200;
- Mastering distance education logistics as does The Spanish National University for Distance Education; and
- Having an organizational structure similar to that of Pennsylvania State University.

COMPUSERVE

CompuServe is a commercial, general-purpose, computer conferencing system that claims to have 800,000 users. It is a truly international

system with users from all around the world. The communication language is, beyond doubt, English. Group communication in CompuServe is conducted in a variety of forums, all accessible from a hierarchical menu structure. When one issues the CompuServe command "GO FORUMS", the Forum Menu shown in Figure 1 appears.

FORUM MENU EDUCATION MENU

1. Aviation Forums 1. Academic American Encyclopedia
2. Education Forums 2. Computer Training Forum
3. Science/Technology 3. Dissertation Abstracts
4. Entertainment/Games Forums 4. Education Forum
5. Financial Forums 5. Education Research Forum
6. Hardware Forums 6. ERIC-Education Research
7. Media/Electronic Publishing 7. Foreign Language Forum
8. Home/Health/Family Forums 8. IBM/Special Needs Forum
9. Professional Forums 9. IQuest Education Info Center
10. Software Forums 10. LOGO Forum
11. Sports Forum 11. Magazine Database Plus
12. Travel Forums 12. Peterson's College Database
13. Science/Math Education Forum
14. Student Forum

Figure 1. Figure 2.

Via each menu option, users may access numerous special-interest forums. Since the users choose the Forums they want to join, they need to relate to only a limited number of users. In some of the smaller forums, one may feel lonely, although CompuServe has about 800,000 users. Via CompuServe one can access reference libraries such as ERIC and dissertation abstracts, buy computer equipment via mail-order, and consult a travel agent. These are the kinds of on-campus services available to traditional students, as well. In addition, several courses have been taught via CompuServe (Conroy 1991). By issuing the command "GO EDUCATION," one has access to the Education Menu as shown in figure 2.

The CompuServe legacy to Electronic Universities. First, the success of the CompuServe system proves that it is possible to serve thousands of students in a computer conferencing system. Second, it shows how special interest groups can be organized to deal with so many users. Third, we see that an electronic university can offer reference libraries, book-stores, and other services provided by traditional universities.

THE ELECTRONIC UNIVERSITY NETWORK (EUN)

The EUN is a commercial enterprise that provides a framework of communication services and administrative chores for organizations that wish to provide distance education courses online. Courses and programs from several traditional colleges and universities are offered through the EUN. The company also promotes flexible transfer of credits among colleges. Since 1984 the San Francisco-based company has enrolled nearly 10,000 students representing all the states and several foreign countries.

The EUN 1991 Catalog offers courses leading to the following degrees and certificates: Master of Business Administration from Saginaw Valley State University; Bachelor of Science in Business Administration from Thomas A. Edison State College; Bachelor of Science in General Business from Regents College of the University of the State of New York; Bachelor of Arts from Thomas A. Edison State College; Associate in Arts from Thomas A. Edison State College; Associate in Science in Management from Thomas A. Edison State College; and several Certificates in Business from Thomas A. Edison State College.

Seventy-eight individual courses are offered by the following colleges and universities: Thomas A. Edison State College, Ohio University, Oklahoma State University, Washington State University, University of Illinois, University of Maryland University College, and State University of New York, College at Buffalo. These colleges and universities are responsible for developing and teaching their courses through the EUN, and for student evaluation and certification.

According to the EUN catalog: "All of these state institutions have regional accreditation. All accept transfer credit from other accredited institutions. Edison and Regents also award credit for experience and for job-related training; you can combine the EUN courses with courses you've taken elsewhere, plus credit for nonformal learning and training." (The Electronic University Network 1991, 10)

The EUN does not provide computer conferencing for group communication; e-mail is provided for one-to-one communication between the student and his tutor. For each course the students receive "Protege", a software package comprising a communication software, a text editor, and a course-specific module. The tutors use the "Mentor" software-package.

The EUN legacy to Electronic Universities. The EUN provides access to courses from several universities and colleges through one single system. It also promotes transfer of credit among colleges and universities. These are two important services in an electronic university. On the other hand, the EUN lacks group communication facilities that are critical in a university environment. Without these, the EUN may be regarded as a distance education organization that has upgraded traditional correspondence courses to more timely e-mail courses.

DT200 - AN INTRODUCTION TO INFORMATION TECHNOLOGY

In 1988, the British Open University enrolled 1,364 distance students (Mason 1989) in a course partially taught via a computer conferencing system. Each of the sixty-five part-time tutors moderated a conference with up to twenty-five students. The communication element was just a small fraction of the course-work; about 350 students dropped out. Still, we must conclude that the Open University managed to handle a large-scale computer conferencing course.

The DT200 legacy to the Electronic Universities. This course has proved that it is possible to handle a large-scale course in a single computer conferencing system when the students are clustered in smaller groups, each moderated by a tutor.

PENNSYLVANIA STATE UNIVERSITY (PSU)

PSU is a traditional university serving 36,000 students and 12,000 employees at the main campus. The university is divided in colleges and departments, responsible for programs and courses. This structure is supported by libraries, computer centers, bursars, etc. Students, faculty, and staff carry out the university chores. Graduate assistants and teaching assistants help professors in the teaching process. Students may also be employed to assist the staff with administrative and executive chores. The PSU legacy to Electronic Universities. PSU is a large organization, divided into many smaller entities. An electronic university, based on computer conferencing, can technically handle these entities in separate conferences, in the same way that substantial number of students are grouped in hundreds of classes taught by professors and teaching assistants. An electronic university, also may cluster students into groups of manageable sizes and large classes may be split into sub-groups taught by teaching assistants, supervised by a professor. In addition, an electronic university should provide support services, such as libraries, bookstores, etc., adjunct to course services.

THE SPANISH UNED

The Spanish National University for Distance Education--Universidad Nacional de Educacion a Distancia, UNED--was legally founded to reach the goals stated in a 1972 Act: "The necessity to develop one of the basic aims of the educational reform, that is to say, equal opportunities for all, requires the implementation of those means that facilitate access to higher education to those who, for reasons such as home residence, work activ-

ities, etc., cannot attend programmes offered by conventional universities." (Garrido 1991, 3)

UNED has about 120,000 students attending a great number of study programmes, and 800 full-time employees make up the headquarters' teaching staff. In addition, 2,500 part-time tutors are engaged at the fifty-three Regional Centers in Spain and Latin America. These Regional Centers "offer information and counselling for people who have not yet enrolled as students, and once a student is enrolled, he or she uses the buildings and facilities provided by the center in order to meet tutors and other students in formal or informal work groups." (Garrido 1991, 4)

UNED uses several different learning media. The most important is printed material. Beside print, radio programmes are broadcasted through Radio Nacional de Espana from 8 to 11 p.m. every evening. Audio- and videocassettes are also important media at UNED.

The UNED legacy to Electronic Universities. UNED has valuable experience and knowledge about distance students' problems and needs. The university has established course development standards and administrative systems developed to support distance students. Furthermore, it has a network of regional study centers, and it utilizes a variety of distance education media. An Electronic University could develop a similar, large-scale infrastructure to handle essential distance education needs.

NATIONAL OPEN ELECTRONIC UNIVERSITIES: A VISION

The following is a scenario about National Open Electronic Universities: universities open to every student who apply and every college that will offer education, universities based on communication technology and national transfer of credits. In this scenario, the National Open Electronic Universities are named NETS. NETS offer a wide range of distance education programs, all independent of time and space. Students and faculty participate in vivid, cross-curricular, and social university environments. Thousands of students access the NETS from home or work. The faculty work for local colleges across the nation.

NETS are NATIONAL universities. They coordinate and increase the efficiency of the national distance education ventures. They imply national benefits for students, faculties, colleges, and nations. Students do not need to relate to several colleges and technical systems. Faculty members have access to a national network of educators, and the colleges may offer their programs nationwide, without prohibitive investments in technical equipment.

NETS are OPEN universities. They are open to everyone who wish to study, independent of where they live, when they work, and previous educational background. Further more, NETS are open for every college to deliver courses and programs. Students may customize their education, choosing

courses from different colleges. Credits are, of course, transferable among the colleges.

NETS are ELECTRONIC universities. They utilize modern technology to create university environments independent of time and space. National computer conferencing systems facilitate written communication. National educational television and radio networks, as well as audio and video conferences, are available for the NETS.

NETS are not science fiction; they can be realized today. The most likely development, though, is a careful evolution from existing educational organizations toward electronic universities. This transformation could happen to open universities such as Open University in England (Mason 1989), the Dutch Open University (Meurs 1989, Enckevort 1988), the Indira Gandhi National Open University (Miller 1988), or The National University for Distance Education in Spain (Garrido 1991). Further, traditional universities, using computer conferencing for on-campus purposes, may merge or collaborate with distance education organizations to form electronic universities.

INTERNATIONAL ELECTRONIC UNIVERSITIES: INCENTIVES AND BARRIERS

Electronic Universities will provide education internationally, global communications networks will eradicate national boundaries, and international communication costs will steadily decrease. Further more, investments in large computer systems will urge electronic universities to expand their traditional markets to attract more customers. Several projects--The University of the World (UW 1990), The International University Consortium (Miller 1988), The Global Electronic University (Utsumi 1990), and EuroPace (Morgen 1990), have already followed this path.

We should welcome the process toward international electronic universities because they will provide more options and better educational quality. They will contribute to more knowledge and better understanding of different cultures and nations. Yet international educational services may create some unpleasant competition for traditional universities and distance education organizations. Most of these institutions are not prepared to meet such competition.

Internationalization will be slowed down by national and state regulations. Within the U.S. it is often hard to transfer credits and certificates from one state to another. In Europe this may be even harder because the national education systems are not well harmonized. However, the European Community is working toward harmonization and free flow of students among member countries. At the same time, the technological development propels interstate and international educational collaboration. It is very likely that international education will be dominated by English speaking universities, most of them based in U.S.A. It is also obvious that

these universities will have a large impact on students and the community they will form. So, it is understandable that smaller nations, speaking other languages, are worried about the emerging educational cultural imperialism. They are afraid of losing some of their national culture, language, history, and tradition in the process. One way smaller nations can prepare for this international competition is to establish National Open Electronic Universities.

INTERNET - THE ULTIMATE INTERNATIONAL ELECTRONIC UNIVERSITY?

Internet offers five categories of services: e-mail, computer conferencing, remote log-in, file transfer, and synchronous communication. The e-mail service is by far the world's most comprehensive. Millions of people all over the world can exchange messages through the net. In addition to private messages, about 2,000 distribution lists disseminate information dealing with a diverse array of topics. The distribution lists are controlled by Listserv, a distributed application that comprise many of the facilities known from computer conferencing systems.

Internet computer conferencing, known as News, Usenet, or Netnews, is a distributed system with which a local host can establish local conferences and join global conferences. A computer can host hundreds of conferences. Valuable features allow a conference to exchange notes with a distribution list.

Remote log-in allows users on one node to log in to another computer in Internet. This feature opens up to many valuable services around the world, including: computer conferencing systems, data bases, libraries, on-line books, and software applications.

File transfer, called FTP, gives anonymous users access to download files from another node. This is a convenient way to distribute data and software files.

Synchronous communication, called Relay Chat, Tell, etc., will allow users throughout the net to communicate synchronously in real time. Internet's main objective is to link educators and researchers together. So, most of the services are of interest to educators. The following examples should, though, be of special interest to distance educators:

- The eight Distance Education Centres in Australia use Internet in distance education (Castro 1990);
- ComServe offers conferences, seminars, and workshops via Internet (Note 1);
- The ICDL Database for distance education at the British Open University is available via Internet (Paulsen 1991);
- Students and faculty at Ohio State University have access to at least nine major libraries and a number of databases via Internet (Dixon

1991);

- The electronic journals DEOSNEWS and the Distance Education Online Journal are distributed via Internet (Note 2).

Commercial messages are not allowed on Internet. Commercial messages are, however, hard to define and in practise impossible to monitor. As a result, there are many announcements of books, software products, and conferences. Commercial services such as CompuServe and MCI Mail offer e-mail exchange with Internet, so these services in fact charge their users for Internet services. Furthermore, many universities and colleges use Internet in their courses and charge students for tuition and computer fees. The eight Distance Education Centres in Australia, for example, offer distance education services through AARN - the Australian branch of Internet (Castro 1990).

An intriguing business idea (inspired by for instance Connected Education) is to offer commercial distance education on Internet. This service would provide access to a vast number of prospective students, teachers, and educational services from all around the world. Such a service would probably trigger some serious discussions about commercial use of Internet. However, Internet has the potential to become the ultimate international electronic university, and one incentive to such a development is to allow commercial courses to be delivered via Internet.

ELECTRONIC UNIVERSITY CHALLENGES

To establish an electronic university is, of course, a huge, multi-faceted challenge. Many economical, pedagogical, administrative, and organizational challenges will need to be faced.

Economical Challenges. Tony Bates states: "Third generation technologies [computer conferencing] are particularly valuable where relatively small numbers of students are concerned, since they avoid the high fixed production costs of the industrial model, but they do not however bring the economies of scale of the industrial model, unless the opportunities for interaction for an individual student are dramatically curtailed." (Bates 1990, 7). Bates' observation is important and correct for current use of computer conferencing. Our challenge is therefore to develop electronic universities so large that the industrial model (Peters 1983) can be applied, while still clustering the users in smaller groups to facilitate individual communication.

Pedagogical Challenges. We need to learn more about how to handle large numbers of students and faculty. In such an environment, it is especially important to share responsibilities and disperse information in an efficient way. Several professors and teaching assistants can be involved in the teaching of a single course. The challenge is to develop

methods for co-teaching of large scale courses.

Administrative Challenges. There are still several applications that are not handled in today's conferencing systems. Management information systems depend more or less on other applications. It is a future challenge to integrate these applications with the computer conferencing system. The most obvious applications are accounting, grading systems, and logistic systems.

Organizational Challenges. There are many questions that must be addressed if several organizations are to collaborate to form an electronic university. Although the agreements will depend on the organizations involved, some important questions will be common to all such situations:

- How can geographically separated colleges cooperate in an electronic college?
- Who should own and run the host computer?
- Who should be responsible for user support?
- What should the colleges pay for the electronic university services?
- What about transfer of credits?
- How can the colleges share resources like library databases etc.?
- How much should we separate or integrate users in programs from different colleges?

CONCLUSION

The examples in this article show that most of the important components of a large scale electronic university are developed by existing organizations. None have integrated them in a single system yet, but there are an abundance of examples showing that the integration process has been evolving. Traditional universities have started to use technology such as audio, video, and computer conferencing to reach out to a larger audience. Open universities integrate computer conferencing into their courses. Several courses are taught through commercial computer conferencing systems such as CompuServe. And, even more interesting, the new technology has already created many new, untraditional alliances. Private correspondence schools collaborate with state universities, and educational organizations, tied together by computer networks and communication satellites, establish relations across national boundaries. It is most likely that both the technical development and the forming of new, strong alliances will continue, and eventually lead to the formation of full-fledged electronic universities.

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NOTES

1. Information about ComServe is available from SUPPORT@RPIECS.BITNET
2. DEOSNEWS is a distribution list that can be accessed from LISTSERV@PSUVM.PSU.EDU

DISTED is a distribution list that can be accessed from LISTSERV@UWAVM.BITNET

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