

# From Collaboration of Universities Towards Creation of Virtual Universities

## —Lessons from a Distance Education Trial —

Ryutaro MANABE

Department of Information Systems, Bunkyo University, Chigasaki, Japan  
(manabe@shonan.bunkyo.ac.jp)

### Abstract

The Asia Pacific Distance and Multimedia Education Network (APDMEN) within the Association of Universities in Asia and the Pacific (AUAP) made the distance education experiment using the satellite link in the fall semester of 1998. This was done as a collaborated work among the three Asian universities supported by Nippon Telegraph and Telephone Corporation (NTT) and Asian Multimedia Forum, the organization of telecommunication operators and network providers. As the main administrator of this project the author is to report the experiment and the lessons learned from this trial extending them to create a virtual university supported by Asian universities.

## 1. Introduction

Asia Pacific Distance and Multimedia Education Network (APDMEN) is a group organized within the Association of Universities in Asia and the Pacific (AUAP) in 1997 for promoting information technology to enhance the higher education, more specifically, for promoting distance and multimedia education among colleges and universities in Asia and Pacific area. Since AUAP is a large organization with about two hundreds member institutions from twenty countries, APDMEN was formed to work together easier as a small group without regard to organizational restrictions. At present representatives from seventeen universities from ten countries and several international organizations are working together.

At the first Board Meeting in October 1997 the representatives from member universities and associated organizations discussed what we would or should do together and decided to set up five taskforces for doing joint researches in the following areas:

1. Distance education delivery system
2. Legal issues, policies, standards and international linkages
3. Training: technical and professional
4. Multimedia Education: courseware production
5. Digital Library

Each taskforce were consisted of two or three member universities and has been active since then.

At the beginning of 1998 we noticed that the organization of telecommunication companies and network service providers in Asian countries, named Asian Multimedia Forum<sup>1</sup>, was offering the Satellite link for free to academic institutions. We took advantage of this offer and made the experiment of distance learning or lecturing from October 1998 until March 1999 using the one-way satellite link offered by Asian Multimedia Forum with the support of NTT (Nippon Telephone & Telegram, Inc.) in order to create a new way of cooperation among universities beyond borders. The general design of the project is shown by Figure 1.

## 2. APDMEN Distance Education Trial

### 2.1 General Technical Design

After making a preliminary survey for using the satellite link for distance education, our university proposed the trial project of distance education using this link with support of NTT to the Board Meeting of APDMEN at Shanghai in April 1998. The APDMEN joined Asian Multimedia Forum as a general member and this trial was treated as one of activities of AMF collaborating

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<sup>1</sup> The AMF was established in June 1997 by a group of 17 leading telecommunication service providers and Internet service providers in Asia. The AMF aims to develop and to promote multimedia applications and services, and to build network platforms through international collaboration among the participants. (from a leaflet of the AMF) For further information visit: URL:<http://asiamf.org>.

with NTT. AMF provided us with its one-way satellite link from Japan to other Asian countries for transmitting class sessions conducted at Tokyo Campus of Bunkyo University. Since everything had to be prepared in a short time, besides our university only two overseas universities, Suranaree University of Technology (SUT) in Thailand and Angeles University (AU) in the Philippines started the project in October 1998.

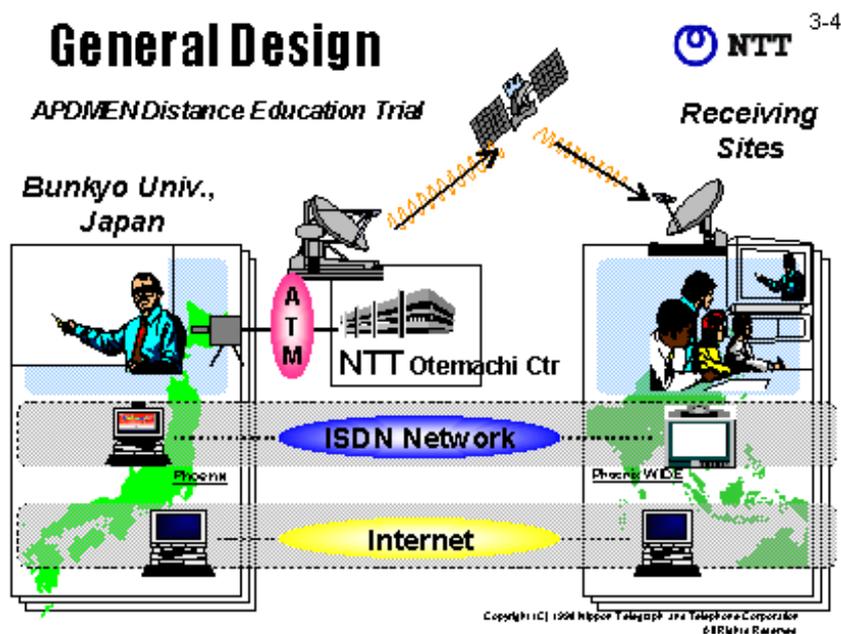


Figure 1. General Design of the Project

Figure 2 depicts the technical outline of this project. Every session was held at Tokyo Campus of Bunkyo University. Instructors gave lectures using a visualizer or computer instead of blackboard or whiteboard. Moving pictures of the instructor and signals of visualizer or computer were transmitted. Technically one frame of image was partitioned into two. One partition was used to send video signals from camera, and another, to send visualizer or computer screen images. The signals were sent to Otemachi Center of NTT in downtown Tokyo through Digital Link 1500, and then transmitted to Asian countries via the satellite, JCSAT 3. Member universities received signals from the satellite and projected the images from BU onto the screens at their classroom or conference room. For delivering the programs to multiple locations we have selected to use IP/TV software<sup>2</sup> distributed by Cisco Systems from a few other systems for sending signals to multiple locations. We selected IP/TV because it used the TCP/IP technology which we had been familiar with in operating the Internet. Additionally we thought that we could apply the know-how of this technology to future distance education using the next generation Internet.

## 2.2 Devices to Complement the One-way Link

As only one-way link was available from AMF at that time, we planned at first to use the TV-conference system through ISDN (Integrated Services Digital Network) to complement the satellite link to assure interactive discussions among remote sites. But it turned out later that ISDN services were not available at the participating universities outside of Japan. Both SUT and AU located away from major cities and no ISDN services were available. Telephone was the only means of interactive communication between Bunkyo and other two institutions as a matter of fact. Of course we used the Internet, too, for sending handouts to remote participants in advance and for communications behind the scenes.

At the final two sessions we used the conference system similar to CU-See-Me through the Internet. But if we send vocal signals and ccd camera signals together, both kinds of signals were not completely transmitted as the bandwidth was too narrow. Then, we gave up to use the internet conference system for sending voices. The instructor talked over the telephone watching the face of questioners on the display sent through the Internet at discussion after the lecture. People at Bunkyo side felt more intimate to other parties than before.

<sup>2</sup> IP/TV is a software which deliver video programs to client computers over computer networks using the internet protocol. For details visit the web site: <http://precept.com>. SRA Co. in Tokyo is a sole representative for selling IP/TV in Japan.

### 2.3 Cost of the Project

As for cost BU bore the cost of the equipment at its site and Digital Access 1500 link from BU to the NTT station (Figure 2). Participating universities had to install the receiving antennas and the equipment for receiving signals and projecting images onto screens at the classrooms. NTT transmitted signals to the satellite for us and lent key equipments for receiving signals at participating universities outside of Japan for free. The AMF associated with NTT offered us its satellite channel for free of charge in the 1998 fiscal year. Before starting the project BU, SUT and AU made a contract with NTT and exchanged the memorandum of understanding for carrying out this trial. One section at NTT in charge of integrating this project set up a detailed schedule for performing this experiment and all parties concerned worked along this schedule. A number of NTT staff worked for us at various sites even at the site where we haven't been. NTT was so generous and supported us technically and financially.

## Outline of the APDMEN Trial with respect to bearing the expenditure

8/18/98, R.Manabe

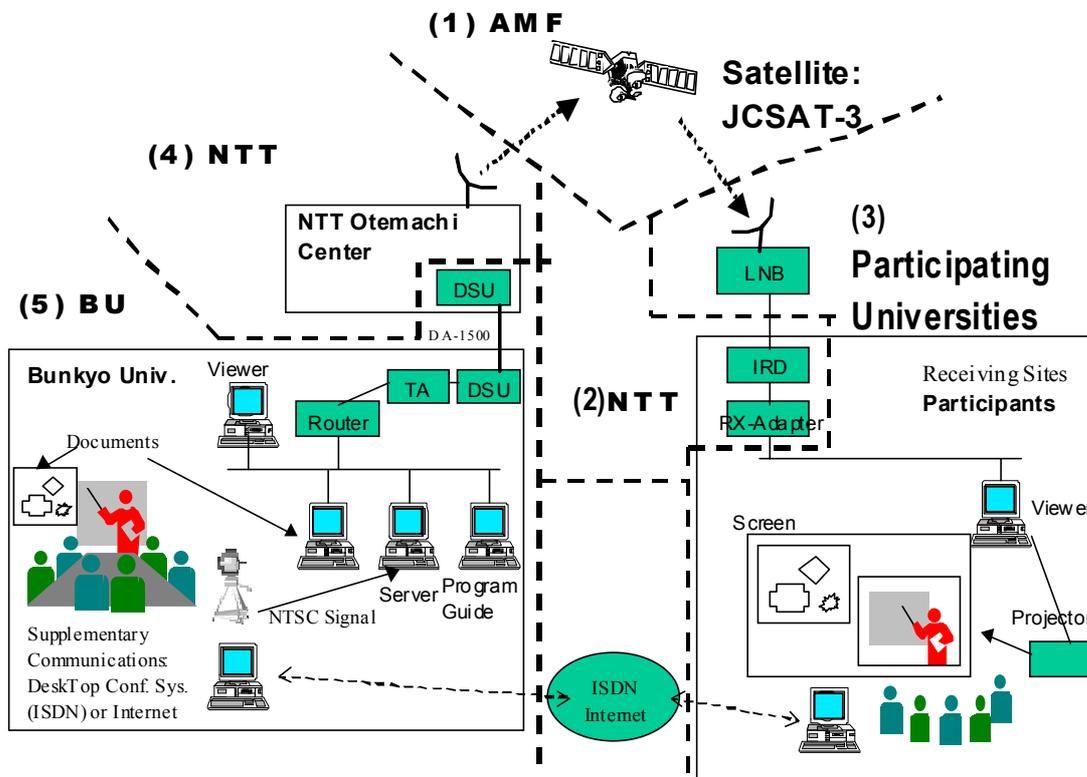


Figure 2. Technical Outline of the Project

I was Main Coordinator of the project. This project was initiated and led by Professor T. Nakamura, Co-Chair of APDMEN, and Executive Vice-President, Bunkyo University Foundation. This project could not be done without excellent collaboration of faculty and staff of universities in multiple countries, NTT and AMF.

### 2.4 Contents of Sessions

During the period between October 1998 and March 1999 twelve sessions were conducted and sent from Bunkyo University to Angeles University in Philippines and Suranaree University of Technology in Thailand. Each session which lasts one hour to one and half was independently organized from others. Twelve sessions shown in Table 1 are classified into the following three types:

(1) Introductions to courses that may be offered by our university in possible distance education programs in the future. Introductions to Information Systems, International Economics, and topics on the Internet Age are such ones.

(2) Internationally collaborated lectures and discussions. Visitors from SUT and AU gave lectures together at our campus. One professor of environmental management at BU introduced his joint work with a Thai colleague and compared different environmental situations between two countries. Discussion by students of BU and AU on globalization of higher education was also

**Table 1. Program for APDMEN Distance Education Trial through the Satellite**

(October 1998 – March 1999)

	<b>Date/Time<sup>1</sup></b>	<b>Theme</b>	<b>Lecturer(s)</b>	<b>Outline</b>
<b>1</b>	Tuesday, Oct. 13, 3 pm	What is Information Systems?	Prof. R. Manabe Bunkyo U.	Introduction to Information Systems & multimedia education at Japanese universities
<b>2</b>	Monday, Oct. 19, 11 a.m.	Joint research Conference	Prof. T. Nakamura, Bunkyo U.	Some members of BU visiting SUT check proceeding conditions. Discussion between Tokyo and Korat.
<b>3</b>	Wed. Nov. 11, 3 p.m.	The Internet and the Society; "The Price of Freedom on the Net"	Prof. I. Wakabayashi, Bunkyo U.	The Internet will become mature as a technical infrastructure in the near future, but meanwhile Cyberspace which is made by new technologies and then causes new social and cultural possibilities and problems for us all. Refer to: <a href="http://www.bunkyo.ac.jp/~cybercul/index.html">http://www.bunkyo.ac.jp/~cybercul/index.html</a>
<b>4</b>	Monday, Nov. 16, 3 p.m.	Countermeasures for the Disables in Severe Disasters	Prof. A. Tanaka, Bunkyo U.	After describing damage and problems in the Great Hanshin-Awaji Earthquake in 1995, issues in helping sufferers, especially the disables, by governmental or non-governmental organizations are discussed.
<b>5</b>	Wed., Nov. 25, 3 p.m.	Educational Use of Computer/ Multimedia	Prof. T. Shakushi, Bunkyo U.	The efficient use of digital technology is required in education for the next century. Some specific examples in educating mathematics and computer graphics are shown.
<b>6</b>	Wed., Dec. 9, 3 p.m.	Japanese Experience of Science & Technology Policy	Prof. K. Koizumi, Bunkyo U.	How Japan has been developed the potential of science and technology, university-industry collaboration, and engineering education in Japan will be discussed.
<b>7</b>	Monday, Jan. 18, 3 p.m.	Computer Education & Internationalization of Higher Education	Dr. Weerapong Piarawan Suranaree U. of Tech, and Dr. E. M. Bamba, Angeles U.	Discussion of information technology training for university faculty and staff by Dr Weerapong. Discussion on globalization of Higher Education in the Philippines by Dr. Bamba. Discussions with BU professors followed.
<b>8</b>	Friday Feb. 12 11a.m.	Role of Distance Education in Enhancing the Quality of Medical Education	Dr. Y. Okada, School of Medicine, Tokai University	Special Lecture for National Convention of Medical School Educators held at Angeles University..
<b>9</b>	Wed., Feb. 17 3 p.m.	Computer Technology, & Globalization of Education	Prof. C. Duval, BU as Moderator, and Students of BU	Students discussions on computer technology and Globalization of education .
<b>10</b>	Monday March 8 3 p.m.	Teaching Japanese to International Students	Prof. H. Hayakawa, Bunkyo U.	Foreign Student Department of Bunkyo University are helping international students to realize their academic aims, to experience Japanese culture, and to enter smoothly into the life of the local community.
<b>11</b>	Tuesday March 23 3 p.m.	Solid Waste Problems in Thailand & Future Scheme of Environmental Aid from Japan	Prof. Y. Fujii, BU & Dr. Somtip Danteravanich Prince of Songkla U.	Environmental management policy and case studies in Asia such as below will be discussed: (1) Solid waste management in Thailand and its Social Issue. (2) Introduction of the recycling policy in Bangkok. (3) Future scheme of environmental aid from Japan.
<b>12</b>	Monday March 29 3 p.m.	Family Name System in Japan	Prof. Y. Ikuta, BU, Prof. J. Bumford, BU and Students of BU	Most Japanese women use family name of their husband family. after they get married. This traditional and still prevailing family name system in Japan is explained and then debated by students.

1) Date and time are in JST(Japanese Standard Time) = Philippine Time + 1 hour = Thai Time + 2 hours.

sent.

(3) Lecture on the topic which no speaker was available in the Philippines was requested by AU. The national convention of medical school administrators and educators was held at Angeles University in February 1999. We were requested to send a keynote talk on the role of distance education to enhance the quality of medical education. No expert was available for this topic in the Philippines. Dr. Okada of Tokai University gave a talk on his researches and experiences of distance education and telemedicine. The lecture was well accepted by Philippine colleagues.

As the Satellite link were no longer available for free from April 1999 and substantial support by NTT finished, we have finished the trial, but we would like to extend this trial to future project as to be described in Chapter 4.

### **3. Evaluation of APDMEN Distance Education Trial**

Although this trial was done using only the one-way satellite link supplemented by interactive communications over the telephone and the Internet, we have much learned technical matters, teaching methods and contents of programs for establishing the regular distance education program in the future. We had some confidence in carrying out the regular distance education program beyond the boundaries of countries.

I would like to evaluate the project from the questionnaires prepared by NTT and Bunkyo and answered by viewers, faculty and students at SUT and AU and instructors at BU.

#### **3.1 Technical Aspects**

The technical arrangements for this project were successful in general.

(1) The way we adopted in using IP/TV was very effective. Originally IP/TV sends one frame of images. By dividing the frame into two, we send both motion picture images taken by camera and computer screen or visualizer images in one frame. As we give more bandwidth and a larger portion to the latter images, students at the receiving sites evaluated the quality of pictures was acceptable. At Angeles University the signals of two portions were taken out separately and projected on the two large separate screens in the classroom simultaneously instead of projecting one frame of pictures with two portions on one screen. This was very effective for watchers to grasp the atmosphere of lecturer and contents of lectures.

(2) Interactive communication tool is strongly required in conducting distance lecturing. In Japan the Ministry of Education made a regulation that distance education should not be accredited if simultaneous interactive communication between instructors and students is not assured. I understand from other experiences that the video-conference system using ISDN is effective in this point. But it is more expensive than the same kind of devices over the Internet. Then, the implementation of the next generation Internet of broad bandwidth is highly expected.

(3) Group communication software, for example, Lotus Learning Space, for assuring interactive communications between instructors and students and among students is required for effective learning environment and for effective instructor-student relationship outside the session hours.

#### **3.2 Pedagogical Issues**

Some Japanese professors are poor at using visual aid in teaching such as overhead projectors and presentation software like MS-PowerPoint. Those who talk all the time in a session without any aids but blackboard are not eligible to teach in remote lecturing. Distance-ed instructors are expected to make full use of visual aids. Many professors who gave lectures wrote such reflections on the questionnaire.

In distance education when instructors do not watch students face-to-face, some other way of instruction methodology should be developed to make learning/teaching more effective

#### **3.3 Why not Other Institutions Did Join?**

Why other universities in APDMEN than only three universities did not join this project? To get a new or large project started in a short planning period strong leadership in organizations and rapidly formed consensus are required. The followings are some of such reasons why other universities could not join the project.

(1) Participating universities outside of Japan were required to install the dish antenna and some instruments at their expenses. For some universities the estimated initial cost was beyond their budget of the year and they could not afford to install the equipment. At some institutions the required equipments were not available locally and it took much time to obtain them.

(2) Some universities had no sufficient staff who manage to operate the proposed systems.

(3) From one university no reply was accepted by the time the project started. We guessed that the university was too large and it took too much time in making a decision to start the new project.

(4) Some member universities locate outside the service area of the satellite.

SUT and AU have fortunately stronger administration to carry out the new project in a short time comparing with other institutions.

## 4. Future scope of APDMEN Distance Education Project

### 4.1. Why We Need Virtual University

Through this trial we wanted to seek how we could collaborate in distance education beyond the boundaries of countries and a new way of international cooperation of universities.

Considering the APDMEN member institutions, financial capabilities, organizational policies, human resources they have, technical capacities accumulated within universities, demands from students and surrounding communities, regulations in each country and many other situations vary very much from country to country and from university to university, too. While most Japanese universities are now at the edge of surviving or perishing as the number of younger population has been decreasing, in most Asian countries the number of people who wish to accept higher education is increasing and demands for new disciplines are also increasing. For satisfying both Japanese and Asian universities, distance education will play an important role complementing what they have not by what others have. To satisfy such demands programs just for you, every student, and just in time multiple universities should collaborate to offer joint courses utilizing information technology.

### 4.2 Steps in Founding Virtual University

Soon after we started the distance education trial, whenever we have face-to-face meetings many of APDMEN colleagues spoke informally of establishing a virtual university in a near future. We have had a dream of establishing an international and virtual university in Asia in collaboration with APDMEN or AUAP member institutions in some future. To realize the dream two of us, a Korean colleague and me, proposed independently the scope of virtual university in our organization. Although these proposal have not yet formally discussed, I would like to extend my proposal here.

It is necessary to take step-by-step procedures in establishing a virtual university by fixing necessary procedures and accumulating experiences because the expertise we have are different from institution to institution. I have proposed the following four stages for establishing a virtual university.

(a) **Stage 1:** Trial of one-way satellite sessions supplemented by narrow interactive tools: This is what we have done last year. At this step planning programs and delivering sessions were experienced.

(b) **Stage 2:** Trial of two way linked sessions through the satellite and TV-conferencing systems: Chiefly because of financial reasons it is difficult to increase the participants to the satellite project. As the desktop conferencing systems using ISDN is more handy to use, we would like to increase the participants using this media. AMF has been planning to open two-way links by the end of the this fiscal year. We are hoping that the link will be available to us at an affordable cost.

At this Step interactive communications through the Satellite link and desk conferencing system will be made and examined among member universities based on the experiments of Phase 1. Delivery of lectures or classes should be made regularly, at least once or twice a week and should be accredited by universities. Besides the satellite links, web pages, CD-ROM and other media should be also be used to supplement distant sessions.

An implementation plan for accredited regular distance-ed programs should be prepared at this stage.

(c) **Stage 3:** Practical implementation of accredited courses: Some member institutions will begin to offer distance-ed courses/programs regularly. Participating universities should make an agreement that the accredited courses offered by other universities to their students. This will facilitate further collaboration among member universities or promote to establish a virtual university in this region. The next generation Internet of broad bandwidth must be used practically at this time and we expect that moving images will be transmitted without difficulty. A specific action program for establishing the virtual university should be made at this stage.

(d) **Stage 4:** Realization of the International and Virtual University within APDMEN/AUAP: The virtual university (VU) will be founded in a country of this region where no regulations exist for establishing such an university and for conducting educational activities. The VU has no campus and offers its own courses via distance education. On the other hand member universities admit their students to take courses offered by the VU. Students of VU take courses mainly offered by VU, and may also take courses through distance learning offered by member universities. Internship at firms, factories, and other organizations in other countries are also accredited. Students of VU may study at campus universities, too, for some periods. The VU offers degrees to the students who have acquired the required number of credits for specific degrees. Most important to a successful VU is to set up an firm organization of associated universities which support the VU in operation and finance.

## References

- [1] Asia Pacific Distance/Multimedia Education Network, "APDMEN-AMF Satellite Distance Education Trial Report," Center for Global Education, Bunkyo University Foundation, Center for Computing Services and Center for International Affairs, Suranaree University of Technology, and Center for Global education, Angeles University Foundation, November 1999.