

Strategic Planning and Perspectives in Promoting ICT-based Higher Education in Japan

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Abstract

This presentation provides an overview of the moves to reform Japanese education and the current state of information and communications technology (ICT) in Japanese higher education. It discusses educational policies regarding the regulation and promotion of multimedia and ICT in Japanese universities. Also it describes some of the activities and the factors encouraging new forms of technology-based teaching and learning.

<Keywords> e-Learning, higher education, IT policy, educational reform, collaboration

Trends and Issues in e-Learning in Japanese Higher Education

In the Japanese higher education system, there are more than 1,000 higher education institutions, of which 708 are campus-based traditional 4-year universities, 508 2-year colleges and 63 technical colleges. Some courses in these institutions have been offered through distance education but not to the extent that distance mode or dual mode are used in universities overseas. In recent years, however, the trend in the area of e-Learning has been spurred upward due to the continuing drop of the college age population since the mid 1990s. The college population was at its peak with 2.05 million in 1992 but it has since then continually been decreasing downwards to 1.15 million in 2003. This has led most of universities to turn to the adult population and life-long learning, thus more use of e-Learning to cater for the needs of this new 'market'. Moreover, during the same decade the world experienced drastic changes in international politics and economics, and new waves centering on globalization and technology have emerged and prevailed throughout the world. In response to these developments and competitive pressures, Japan urgently needed to reform its education system, which has led to the adoption of ICT in teaching and learning.

Moves towards the wider adoption of ICT began with the 1996 Advisory Council report, Higher Education by the Use of Multimedia in the 21st Century, supported by NIME's research into the use of technology in Japanese and overseas universities. This report stressed the urgent need for higher education to respond to societal and global change, to match world's best practice and to use multimedia and flexible learning to expand and reform higher education and provide more opportunities for life-long learning. It made recommendations regarding the hardware, infrastructure

and learning environments needed for such change; for a national institute to support such initiatives and undertake research and development; and for the transformation of correspondence education into ICT-based open and flexible learning.

The higher education system was subsequently reviewed by the University Council, certain measures were put in place, and NIME was reorganized to be the core institution to meet these challenges (NIME, 2000). These government policies have been adopted and the ICT infrastructures put in place. Since that time some higher education institutions have started offering courses through the internet (NIME annual survey).

Japan's IT policies in Education

The G8 Education Ministers' Meeting and Forum in April 2000 singled out the importance of lifelong learning, distance education and ICT. At the Kyushu-Okinawa Summit the G8 leaders also focused on the information technology revolution. The June 23, 2000 *Report of the Study Group on Young People and Media Literacy in the Field of Broadcasting* by the Ministry of Posts and Telecommunications interpreted media literacy as the ability to function in the media society, and stated that:

. . . the emergence of the Internet and digital broadcasting has exponentially increased the amount of information in our environment, while the form in which we receive information has shifted from printed media to electronic media including image. In addition, the form of the information itself is undergoing significant diversification, from mass media sources such as newspapers and broadcasting, to personal media such as the Internet; and at the same time there is a certain amount of crossover, since the conventional mass media also provides information on the Internet . . . In view of the fact that the senders of information are far fewer in number than those who receive it, despite the diffusion of personal media, the mass media should consider the variety of values in society, and should set higher moral standards; while citizens should actively participate in the media society, and take the initiative to inform themselves about the issues and technologies involved.

The use of media in lifelong learning was directly addressed in a report, *Measures to Promote Lifelong Learning Using New Information and Communications Technology: Prospects for Expanding Lifelong Learning in the Information Age*, issued in November, 2000 by the Lifelong Learning Council. This report recommended:

- Setting up training schemes and creating opportunities for people to master information literacy;

promoting the informatization (Information and Communications Technology Environment) of facilities used for lifelong learning.

- Enhancing the environments in which Internet use takes place.
- Developing instructional materials for use in lifelong learning.
- Building up a database of learning opportunities.
- Building a system to make university extension courses more widely available to ordinary citizens, using public facilities such as community centers.
- More and better learning opportunities at the graduate school level and expansion of learning through the University of the Air via satellite communications and the Internet, together with simultaneous coordination of these two communications methods.

e-Japan Strategy Initiatives

As part of the government's initiatives "e-Japan strategy" was declared in January 2001. It sought to improve the information literacy of all the public, with due consideration to seniors and the disabled, and drastically exceed the estimated Internet diffusion rate of 60% by 2005 (and to) reinforce IT-driven education systems at elementary, junior and senior high schools and universities and enrich the lifelong education on information for all adults.

The *e-Japan Priority Policy Program* has since been launched, with the following policies adopted for educational reform:

- Provision of an IT environment in schools.
- Enrichment of IT education.
- Promotion of exchange with other areas and different cultures using IT.
- Enhancement of ability to teach pupils in IT.
- Enrichment of educational content.
- Instigation of educational portal sites.

Soon after this, the *e-Japan promotion Program 2002* was announced, focusing on the:

- Promotion of the widespread use of high-speed and ultra high-speed Internet connections.
- Informatization of education and intensification of personnel training.
- Enrichment of network content.
- Promotion of electronic government and electronic administration of autonomous bodies.
- Intensification of internationalization

It is worth noting that two of these five key issues relate to education and one to internationalization. There will also be a rapid push to utilize and reinforce information literacy

education and ICT with the public at large. A number of other developments have also supported these moves.

Policies such as e-Japan Promotion Program were formulated by IT Strategic Headquarters under the Cabinet headed by Prime Minister. The IT Strategic Headquarters is comprehensive for all of government ministries and agencies. In July, 2003 e-Japan Strategy was adopted for the objectives of improving the international competitiveness of Japan's human resources within the international labor market by expanding the various available learning options to enhance the abilities of individuals. For example, it aims to increase the number of university and graduate courses available through distance learning via IT technology by FY2005 to approximately three times that of what it was in FY 2001.

To realize interactive distance learning, the facilities (soft and hard infrastructures) must be improved that will enable distance-learning options to be set up throughout the country which are inexpensive and make use of interactive high-definition video. In order to develop and maintain a system whereby professionals can continuously enrich their knowledge in their field through distance learning via IT technology, various educational options must be expanded and enhanced in accordance with the characteristics of each field, for example, by developing an environment whereby student can obtain all the university credits they need via distance learning.

Furthermore, in order to improve Japan's international competitiveness in the IT field, flexibility must be maintained with regard to learning opportunities, and various methods promoted, including IT distance learning. At the same time, the development of high-level human resources are to be developed through the expansion of IT-relevant graduate school department, etc., as well as more practical-based IT education, etc., which will be continued at the same time creating a firm base for the development of high-level human resources.

Informatization of Higher Education in Japan

The government's plans, policies and support for the systematic implementation of informatics education embrace not only the teaching of informatics, but the improvement and extension of higher education and domestic and internationalized distance education by means of ICT networks and the development of new forms of teaching and learning attuned to the needs of the information society. For students to adapt to and prosper in such a society, it is seen as essential that they acquire the initiative, knowledge and skills to make effective use of ICT and the capacities to handle, select, process and transmit the vast amount of information available to them according to need. The Japanese government and educators are also aware of the undesirable aspects of the information society and express the view that technology is simply an instrument, that ICT delivers no more than

a 'virtual experience', and that e-learning, however laudable and necessary, should never take the place of engaging in real life experiences in with other people, within society, and within the natural environment. These plans and viewpoints set the framework for informatization in Japanese higher education.

The following are major networking systems developed and utilized for the informatization of education:

1) Space Collaboration System (SCS)

The first initiative for the informatization of education in higher education was the installation of the Space Collaboration System (SCS). The SCS was launched in 1997 with its hub at the National Institute of Multimedia Education (NIME). The SCS is a videoconferencing system characterized by wide coverage, simultaneity, two-way interaction and easy operation. Though it has been used for delivering and exchanging courses at distance, originally it was not developed for distance education but as an interactive tool for collaboration in academic research connecting to various other networks. For that reason it is different from the videoconferencing systems designed and used strictly as a delivery tool for distance teaching and learning in other countries.

There are now 150 VSAT stations in 123 universities and other institutions for exchanging lectures, seminars and academic meetings. Every VSAT station can host lectures, seminars, conferences and other events. Each VSAT station is equipped with two large display screens: one showing the incoming image from the communicating station: the other, the image from the home site or third station in contact. An operating desk is equipped with terminal devices which are easily operated by a teacher or facilitator. The organizing university/institution acts as moderator and calls up the other participating station(s). When someone at a receiving station wants to raise a question or express an opinion, that station makes a request to speak via a touchscreen device.

The SCS is used for 3,000 hours per year. The system provides two parallel channels, allowing two satellite communications-based classes to be conducted simultaneously. Thus, five or so hours are used per channel per week. Some graduate schools recognize regular credits in jointly held SCS distance classes and seminars and provide distance tutoring to graduate students on an individual basis.

With the development of the SCS various aspects of higher education and the actual teaching and learning environments have changed and innovated. Its simultaneous multi-point connecting capability enables the users to try a variety of innovative educational programs and research schemes which were not possible before. Since the inauguration of the SCS operation NIME has conducted several major international conferences and workshops by combining SCS and other network technologies which made it possible to keep discussions going at a number of different sites within

and out of Japan. This innovative satellite network system introduced into Japanese higher education has been contributing to bringing changes into classrooms, laboratories and university management and administration in Japan.

2) Medical Information Networks (MINCS)

Another national system, the MINCS-UH (Medical Information Network) links 30 university hospitals with the world's first digital high-definition bi-directional television broadcasting system with security protection by digital cipher. Hokkaido Information University uses a communications satellite to deliver its Promoting Information Network for Education System (PINE-NET) distance education courses to 16 branch schools around the country, and simultaneously uses a terrestrial system to provide three lessons a day, each of 90 minutes' duration. Tokyo Institute of Technology and Hitotsubashi University exchange satellite communications-based classes through a system called ANDES (the Academic Network for Distance Education).

3) Use of Broadcasting (University of The Air)

The University of the Air (UAJ) and University of East Asia (UEA) broadcast their lectures nationwide via satellite networks. The UAJ, the prime institution for lifelong learning in Japan, has more than 81,000 students. Students in their 30s and 40s account for 60% of the enrolment (although its oldest graduate has 80 years of age). These figures indicate the ever-increasing significance of the UAJ as a source of lifelong learning opportunities for all levels of society. In its capacity as a correspondence college, the UEA broadcasts its programs daily between 6am and 12pm, including those related to regular graduate school courses.

4) el-Net System (Lifelong learning)

The Ministry of Education's el-Net system, using the Superbird B communications satellite with terrestrial stations in more than 1,600 educational institutes (including VSAT stations and receiving stations) provides continuing professional development for teachers and others concerned with education, and for the Open College, which provides lifelong learning for the wider community. Twenty national, five public and twenty-five private universities and one public graduate school also provide the general public with access to 172 university-level courses.

Reorganization of NIME - Its Mission and Research Activities

As a result of the Japanese government reform measures in the higher education system the National Institute of Multimedia Education (NIME) has been incorporated into an independent administrative institution. In its newly reorganized form, NIME is still expected to play a leading

role in promoting and supporting IT-based teaching and learning as the core institution to support higher education in Japan.

NIME continues to contribute for the advancement of higher education by conducting research and development into educational methodologies and contents for advanced media, the results of which are adopted by higher education institutions. Its research and development places an emphasis upon e-Learning. It also encompasses research into improving multimedia learning environments, developing digital learning resources, promoting the application of multimedia technology, survey and international research. NIME also engages in collaborative studies with universities in Japan and overseas, conducts government-policy research projects, and pursues exploratory research.

NIME manages higher educational information portals, develops and distributes educational contents, and operates educational networks via the Space Collaboration System (SCS), an inter-university satellite videoconferencing communications network. The establishment of the Council of ICT Support for Higher Education has also strengthened NIME's cooperation with related consortia. NIME also runs training courses, forums, and international symposia.

1) Main Mission

- Support for the building of Japanese-style e-Learning
- Links with domestic universities
- International Links

2) Specific Initiatives

- Construction of the NIME-GLAD (Gateway for Learning and Ability Development) System
- Linkage with universities overseas such as through GLOBE

3) Key NIME Activities related to e-Learning

- Surveys & research in e-Learning including surveys on IT use in higher education institutions
- Support for university e-Learning activities by promotion of joint R&D
- Dissemination of educational content
- Building of NIME-GLAD (Gateway to Learning & Ability Development) system
- Support for national policies including surveys, analysis and reporting of results

Domestic and International Links

1) NIME-GLAD – A Comprehensive Higher Education Site

NIME is planning to prioritize its R&D into e-Learning, on which universities and other institutions of higher education currently place great emphasis. This project will be pursued mainly by the R&D Department of the Digital Learning Resources Division in collaboration with the Program promotion Department, and will incorporate a network to support collaboration with universities and other institutions currently developing e-Learning courses. NIME aims to support e-Learning courses at universities and other institutions by centralizing all Japanese higher education e-Learning services, thereby enhancing convenience to students.

In this network, metadata known as LOM (Learning Object Metadata) is similar to the library index card. Tagging LOM to all Internet e-Learning courses enables learners to use a LOM Search System to check related information across all universities. It is hoped that this scheme will contribute to an increase in the number of university students enrolled in e-Learning courses. NIKE is also considering R&D into using mobile phones to automatically receive information from universities via the Internet.

The system and the information provided by NIME-GLAD are as follows:

(System)

- New LOM (Learning Object Metadata) search function
- Student registration and certification system
- Learning management (setting learning goals / managing academic records) function
- e-mail notices function
- Conversion service to cell phone
- Online payments function
- Management of academic results and course accreditation
- Self-check of professional ability
- System of links to National Information Center for Education Research(NICER)
- Other

(Information Provided)

- e-Learning courses at universities, etc
- Learning content at universities, etc
- Academic lectures at universities, etc
- Public seminars at universities, etc (lifelong learning)
- Information on university syllabi
- NIME online educational materials
- Information on copyright for educators
- Information on learning support
- Information on searching for elementary to lifelong education

2) GLOBE (Global Learning Object Brokered Exchange)

Five regional consortia for the joint ownership and re-use of educational content around the globe and core national organisations; ARIADNE Foundation (Belgium), education.au limited (Australia), EduSourceCanada (Canada), MERLOT (U.S.A.) and NIME (Japan) agreed on 27 September 2004 to join to form a global network; "GLOBE".

[Matters for discussion by GLOBE]

- Planning for the joint ownership of searchable information about educational content.
- Providing a service where users can perform searches for required information across the globe.
- Summarizing the needs of each region and promoting the joint ownership of various services, including the reciprocal use of educational / learning support tools.

Conclusions

The Japanese economy has been under-performing. New responses are needed to meet the challenges of globalization and the information age. Japan's image as a technological giant and innovator has been fading, the country is falling behind other industrialized countries in e-education and e-commerce, and there is growing competition from overseas, virtual and private educational providers. In response to the currents of the time the kind of workforce required by society has been changing. In consequence, university reforms in higher education have swept across Japan and, as of April, 2004 all of the national higher education institutions (universities and inter-university research organizations) have been incorporated into independent administrative institutions.

Japanese higher education institutions today are reviewing and revising the ways in which they must be transformed to meet the need for innovation, economic regeneration, and globalization. Japan shares many of the challenges of the other mature economies. It is also aware of its regional responsibilities and the need to help developing nations and in alleviating the digital divide. To achieve these goals, changes are needed in the leadership and management of higher education, in pedagogy, and in attitudes towards and uses of technology. Historically, change has been a slow process in Japan. However, it is envisaged that ICT-based education, international collaboration and exchange and the virtual mobility of staff and students will develop over the next few years, spurred on by recent government initiatives and policies for educational and socio-economic reform and Japan's vested interest in technology development and application.

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