

Educational Paradigm Shift in Universities and Multimedia Technology

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Abstract

In this report, the author described a view and problems of universities with multimedia in near future. Then, optimized framework of paradigm shift was described. It was drawn to be based on a chain of technological and methodological innovation in universities, which included novel concept of credit system, distance education and instructional styles. In addition, the author showed concerning internal requirements for leap into next paradigm.

Keywords

Paradigm Shift, Mediated University, University Reform

Introduction

Recent higher education sites in Japan have been facing rapid reform reflecting from the international social changes and technological innovation.

In this year, Over 60 percent Universities have been already wired to Internet, the satellite telecommunication system was introduced to 50 higher education sites and credit regulations were revised by the official support. With this background, they are expected to challenge infrastructure and leap forward.

Infrastructure of Institutions

In 1985, an Ad Hoc Educational Council in Ministry of Education submitted suggestions of the correspondence to informatics society and university reform, and proposed to set up the University Council for investigating future vision of universities and how should take measures with comprehensive ways.¹ In addition to this, the Ad Hoc Council further suggested that universities should try to activate education through information technology.

Continuously, this University Council submitted a study report recommending requirements be particularly developed science technology education and be filled up the facility, equipment and staff required for advanced technology in 1986.²

Infrastructure of University Curricula

On the other hand, an Education Advisory Council in Ministry of Education submitted a report recommending requirements be relaxed for establishing universities, and more freedom be given in the drafting of university curricula³. Also University Council proposed the upgrade quality of education rather than expanded thin quality, to enhance individualization and to develop higher educational level as well as same matters as above.⁴

As the background of this movement, the University Council recommends the future scope of population of students in higher education sites.⁵ The surging population of 18-year-olds will peak at 2,505,000 in 1992 and decline to 1,510,000 in the year 2000. Therefore, universities and colleges must make the current period an opportunity to raise their level of education and research.

Paradigmatic Shift of Higher Education in Japan

As showed previous section, the major strategy of University Reform was not competitive and survival principles, but to develop the quality for meeting the growing demand of higher learning, to consider special scholarships for adult student, to accept foreign students and instructors, and upgrade the education level to adapt the changes in the structure of industry and vocation areas. Moreover, all the issues are deeply concerning with the educational methodological changes that arise from high technological innovation.⁶ Emerging paradigm has just come. According to Kuhn, paradigm shifts occur when a paradigm enter a crisis-like state: "All crises begin with the blurring of a paradigm and consequent loosening of the rules.... and close with the emergence of a new candidate for paradigm and with the subsequent battle over its acceptance." In addition to this, he stated either conventional or novel set of beliefs can be used to solve the problems, but "never complete overlap"⁷. If a shift is achieved, the new paradigm is no longer seen as a radical approach, but as the only way to operate.⁸

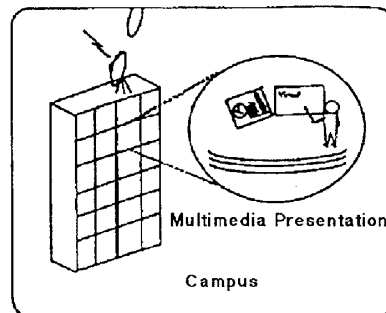
Then, the future higher education institutions in Japan were viewed as a paradigm while providing insightful views into paradigm's configuration and possible metamorphosis to a new emerging paradigm in this report.

Configuration of Paradigm

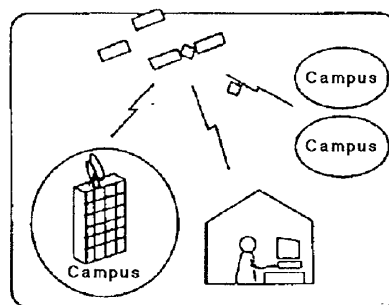
Recently, Kikukawa viewed mediated future universities in Japan in three stages,

that is Traditional Universities (TU), High Media Use Universities (HMUU) and Next Generation Universities (NGU).⁹

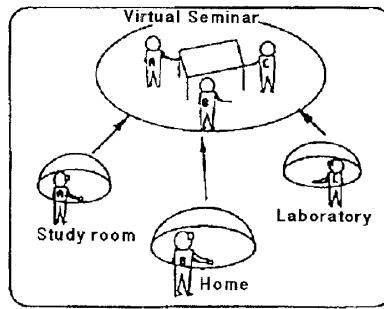
Traditional Universities (TU) : Traditional universities use media on-campus. In this form, media are mainly used in classrooms for presentations, that is, accessing external bases on-line and presenting such data in classrooms. Creating “a remote education environment” through inter-university networks, and lectures can be exchanged among universities.



High Media Use Universities (HMUU) : In this type of university, media are used both on-campus and off-campus. Basically, this type makes good use of media utilizing communication network systems and individual learning systems while maintaining functions of traditional universities. Lectures are delivered both in classrooms and outside the campus through networks. Regarding experiments and practice, VR (virtual reality) is introduced and face-to-face classes remain. For lifelong learning, comprehensive measures are taken off-campus functions.



Next Generation Universities (NGU) : This type of university is often called a “virtual university.” In this type, traditional campuses do not exist and the “virtual” university exists on-line. The entire curriculum is realized by teachers delivering their lectures on the network. In addition, an individual learning system is available utilizing a database which enables advanced response.



(Applied from Kikukawa, 1995)

Grew viewed paradigm shift focusing on the Information Superhighways (IS) with world wide view point.¹⁰ IS is notably influenced by GII declared by USA vice president Gore in 1994. Grew set IS as the center technology of future society and showed a paradigm for shift (Table 1).

Table 1 : Paradigmatic Shift in Higher Education (From Grew, 1995)

Present Pre IS Higher Education that emphasizes	Bypassing an Optimistic Future with IS Higher Education that emphasizes	To a Pessimistic Future with IS Higher Education that emphasizes
Local Focus	Global Networking And Access	Universal Standardization
Fixed Curriculum	Flexible And Open Curriculum	Gated Curriculum
Self-Containment	Strategic Partnering	Cartelized Super Structure
Instructional Focus	Student/Client Focus	Network/ Technology Focus
Media/Technology Supplementation	Multimedia Integration	Multiple Media Proliferation
Reactive Planning	Pro-Active Planning	Obsessive Planning/ Control
Once Only Education	Life-Long Education	Incessant Information Acquisition
Local Byways	Super Highways	Super Gridlock

Comparing two perspectives, it can be found that management and educational methodological shifts were the center in Grew's while introduction of innovation was centered in Japan.

Because suddenly, puzzlingly, we encountered next big technological wave. Japan was clueless in cyberspace. Also nearly all the key elements in the multimedia technol-

ogy are underdeveloped. Such as, cable TV which is a major part of the IS infrastructure, is within of 96% of American homes, however only 19% of those in Japan. In the U. S. A. 52% of personal computers are hooked into a network against only 8.6% in Japan.¹¹ It is clear that we are slipping behind in a crucial technological network race, however now we find apprehend about.

Emerging Paradigm

Summarizing the recent movement in Japan, the author viewed future higher education by setting multimedia base issues as the trunk of surrounding issues in a position paper (Figure 1).¹²

At the first stage, network bring beneficial effects as the learning materials for students in conventional style classroom (Intelligent University). Then, high speed

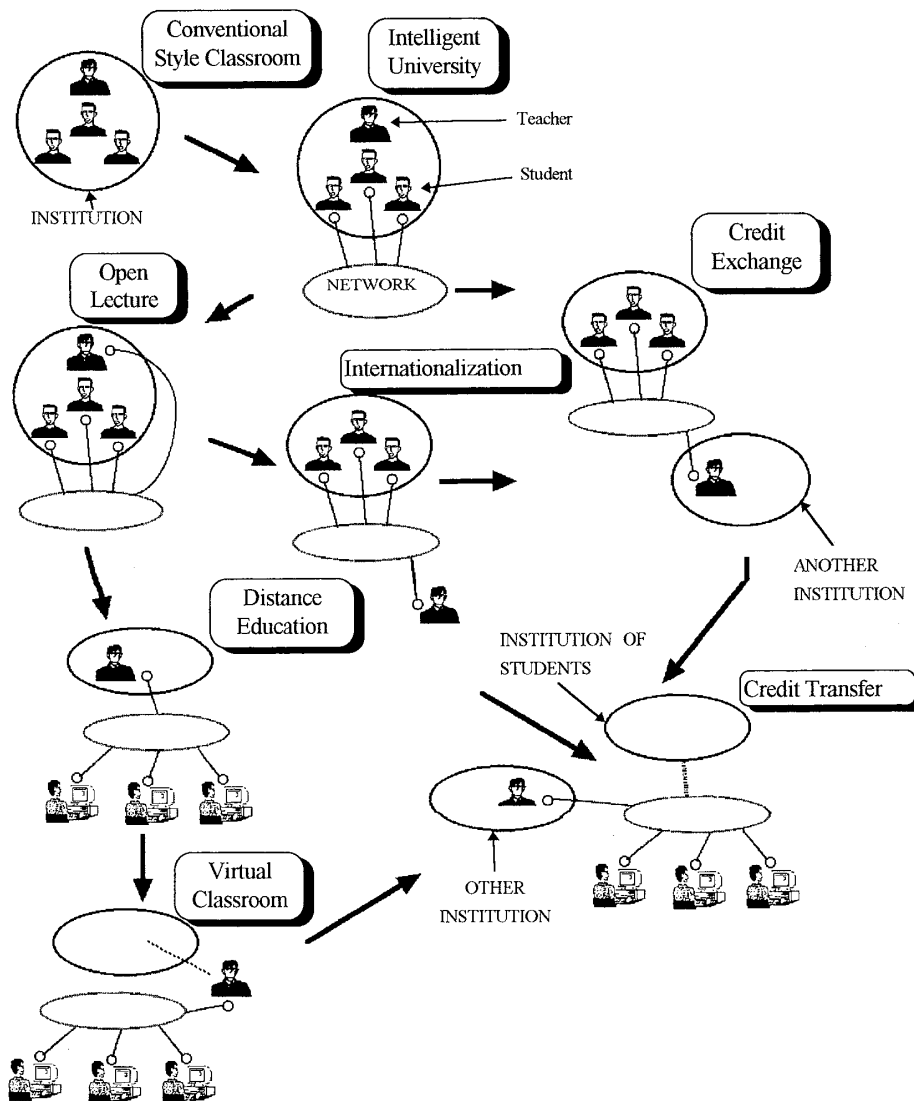


Figure 1: Future View of Higher Education Sites (From Yoshida, 1996)

network enable substitute instruction between teacher and student (Open Lecture). Mediated communicative way bring various instructional style, such as introducing to Distance Education style and Internationalization with an invited teacher who lives in a foreign country. It can be found that further transformations include overt changes of university credit system, moreover for clarifying underlining instructional effects of network, educational methodological researches must be developed beyond the framework of conventional curriculum and face-to-face instructional ways.

Recently, we have a substantial movement of future higher education from bureau side. The Social Gathering for Scope of Higher Education Utilizing Multimedia in 21st Century (SG21) was set up on January, 1996 under the sponsorship of Ministry of Education. The aim of SG21 was to investigate the scope of higher education in 21st century that can be equivalent to future multimedia development.¹³ Also it was intended to challenge to develop superior and more qualify higher education as well as be utilized multimedia through enhancement. In the final report of SG21, disseminating network which use satellite telecommunication system, spreading academic information network, to infrastruct LAN system within each university, and so on, of needed measure for future multimediated universities were reported as requirements¹⁴. The report of SG21 also recommended the internal requirement such as executing distance education or refresh education, making investigation of novel instructional style and graduate school with distance education methods.

Clearly, bureau side aimed to leap, and concrete plan of reformation with multimedia is going on.

The bureau movement

Reflecting the final report of SG21, the Education Ministry plans to revise its standards governing university courses to allow students to earn credits and to permit students to take classes from professors in distant campuses in classes conducted via a telecommunication satellite or network.¹⁵

Now, there is a progressive projects to examine future flexible education which includes distance instruction through network between 16 public and private universities. This project enabled with a joint multimedia project which put forth by Nippon Telegraph and Telephone (NTT).¹⁶ There is a credit-exchange system in place to allow students to accumulate credits from courses taken at other universities, however the Education Ministry requires students to be physically present in the classroom to do so.

Target for Leapfrog

Technological innovation has a trend to make us clarifying our immediate target for external changes. However, targets for internal changes are varied behind brightness of introducing multimedia. Thereinafter, the author described some immediate requirements of internal changes.

Leap of Instructors

The new technology and the new media will make wonderful servants but very poor masters.¹⁷ Bates proposed 12 rules for technology use, and some of these are quite suggestive to this direction.

Teachers need training to use technologies effectively: Teachers and instructors need training not just in the choice and use of appropriate technologies, but more fundamentally in how people learn, and in instructional design. Lack of appropriate training is the biggest barrier to the use of technology in education.
(From Bates, 1995)

Recently, some associations have been attacking human development of multimedia technique that includes curriculum development competencies and examination for qualification, and some parts are related to instructional skills in a university class.¹⁸ However, the movement is not reach to instructors yet.

Cost Problem

On the other hand, now we have a severe problem in cost for network. Japan is leading USA in setting up a nationwide fiber-optic network. Every trunk circuit connecting cities, including even the remote island¹⁹. However, the network is not distributed in the public uses compared with USA. Because the present charges are bound to make future multimedia services too costly to extend to ordinary households. Nishi, set up ASCII Pub. Co. in 1977 at age 21, told a following severe opinion. "Data communication requires a fee for merely hooking up to the network. That is like charging admission for going into a bookstore."

Reflecting the much claim of cost in networking, NTT decided to decrease charges of digital line for households to about U. S. \$300-400 per month.²⁰ However, new price

is still expensive for people. Therefore the role of government in this information age is quite important. It is said,

“The advanced nations are obliged to help the spread of computers and communications in developing nations. If the governments official development aid is used for that purpose, the economic development that took Japan 50 years to achieve might be complete in 10-20 years in other nation.”²¹

Language Barrier

Secondary school curriculum has 6 years foreign language classes, however, nevertheless, most of the students have the difficulties and lack of motivation in English communication.

Recently, some translation computer programs were appeared on the market, which are the ‘helper’ or ‘plug in’ type programs and enable to translate homepage into Japanese automatically within a WWW browser. These programs will strongly decrease the effort of students to recognize information and spread their interest.

On the other hand, to solve the lack of communication experience in the conventional lecture, cooperational or collaborational method of instruction must be researched.

Philosophy of Courses

To leap into next paradigm, students must develop a belief that there is some kind of actual space behind the CRT screen, first of all. “Cyberspace” which was named by Gibson encompasses the huge amount of data in Internet. As Alvin and Heidi Toffer told that “Cyberspace is the land of knowledge”, students would feel unthinkable complexity.²² However they will learn how to trade off soon, and embody effort of critical thinking and solving their problems.

In some parts of future education, students will perform their learning activities in the cyberspace. Continuously, the role and instruction of teacher will change.

Final Statements

Usually, the argument of multimedia used to be centered in technological flavor, however, it would be required that harmonious project researches that are cooperated technological side and educational side must be essential to support successful paradigm shift to disseminate the profit of multimedia and cyberspace. Also, it is apparent that each stage shift is closely related one another, therefore a pinpoint research would not go on well to persuade some barrier.

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大学におけるパラダイム・シフトと マルチメディア技術

吉 田 雅 巳

キーワード

パラダイム・シフト, 大学の情報化, 大学改革

本報告では、マルチメディア技術が導入された大学の将来像と想定される問題点を述べた。ここでは、単位認定制度や遠隔教育、教授スタイルの新たな考え方を含んだ大学の技術的および方法論的变化に着目している。加えて、次のパラダイムに飛躍するために必要な内的要因についても示した。