Survey Research on e-Learning

in Asian Countries - Fiscal Year 2002

(Country Specific Report - China)

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1. Market: Market Trends of e-Learning

1.1 Status of IT Promotion (Centered on the Internet)

1.1.1 Outline of the Internet

According to the 10th CNNIC Internet survey results, the number of Internet users as of June 2002 is 45,800,000. Among these, the number of users connecting to the Internet via dedicated lines is 9,460,000, while the number of those connecting via dial-up connections is 26,820,000, accounting for nearly 60% of all users.

The number of ISDN users is 3,150,000. Although the usage of broadband connections considerably lags behind, with broadband users being 2,000,000, services including ADSL and CATV have started in various cities. Specifically, the number of subscribers to CATV is 80,000,000 (25% of all households and 85% of households in urban areas), which may imply a future increase of high-speed Internet users using CATV.

The number of Internet users in China has rapidly increased in these few years. The increase in the number of users subsided for a short time after peaking in January 2000, but the number has been again increasing since January 2001.

Reasons for this increase in the number of the Internet users include (1) lowering of prices for products related to personal computers, (2) an increase in incomes of Chinese citizens, (3) a drastic increase of Internet cafes, and (4) the internationalization of China.

However, Internet users account for only 4% of the total population. Attributes of users show that 75% of users are male and 88% are under 35 years old, thus indicating that a limited group of people use the Internet. Furthermore, most users are located along coastal areas including Shanghai, Beijing, and Guangzhou, but there are almost no Internet users in inland areas.

While most users are university students, more than 900 schools and research institutions (including more than 800 universities) have been connected to the Internet since China Education and Research Network (CERNET, transmission rate of 2.5Mbps) was started in 1994.

1.1.2 Outline of ISP

ISP providers in China consist of IAP (Inter Access Provider) and ICP (Internet Content Provider). In most cases, ISP refers to IAP. To establish an ISP, authorization must be granted by the Ministry of Information Industry. Initially, ISP in China was comprised only of the Ministry of Posts and Telecommunications, which is equivalent to the former Ministry of Posts and Telecommunications of Japan, and connection itself was restricted. However, in September 1995, Internet service was publicly approved with certain conditions equivalent to conditions of a Japanese secondary provider. In addition to the Ministry of Posts and Telecommunications, ChinaNet InfoTech Co., Ltd. was established as a provider in June 1995, being jointly funded by the domestic bank, scientific agency, foreign trade agency, and Tsinghua University. Since then, number of enterprises that have entered this business has increased rapidly.

The number of Chinese providers was only four or five in 1995, but it is estimated that this increased to approximately 80 by the end of 1996. Since 1997, more and more providers have been established in big cities such as Beijing or Shanghai and in areas along the coast. The number of enterprises who wish to join this market does nothing but increase, accumulating to more than 520 with licenses granted by the Ministry of Information Industry by 2000. Meanwhile, local governments or enterprises were authorized to begin investment in the information infrastructure, which had traditionally been engaged in exclusively by the national government. Among the Internet connection networks established after 1998, China

International Economy and Trade Net (CIETNET) was established by the Ministry of Foreign Trade and Economic Cooperation, in addition to China Unicom Network (UNINET), China Netcom Network (CNNET), China Mobile Network (CMNET), China Great Wall Network (CGWNET), which were established with funds raised jointly by local government, single or multiple enterprises, or with funds raised jointly by the central government, local government, and leading national enterprises.

The total capacity of providers' international lines also increased rapidly from 84.64M in July 1998 to 241M in July 1999, 1234M in July 2000, and 2799M in January 2001.

1.2 Status of Education and Training System

1.2.1 Higher Education

As indicated by a slogan used since the 1990's promoting "national development through scientific technology and education", scientific technology and education have invariably been attached importance for economic growth. In the "Outline of the 10th Five-year plan for National Economic and Social Development", which was adopted in March 2001, penetration and expansion of education was considered important, and goals for school attendance rate of the latter part of secondary and higher educations, which had not been paid much attention in 1990's, were set to 60% and 15% respectively.

Major administrative policies that continue to focus on usage of IT in education are as follows:

(1) Project to utilize information in education

All higher educational institutions, secondary schools, and part of elementary junior high schools and elementary schools will be able to connect to the Internet by 2005.

(2) Preparing leading universities and disciplinary areas and Project 211

As the second phase of the Project 211, which is an investment plan with emphasis on leading universities and disciplinary areas, high-technology areas will be a special concern.

(3) Project to convert higher educational institutions into high-technology industry

Collaboration among industrial, educational and research sectors will be strengthened to promote experimental construction of science parks within specific 15 universities and to assist operations of enterprises in universities engaged in high-technology fields.

Higher education in China including universities and above is categorized as universities (four to five years for main course), special course schools (two to three years), master's courses (two to three years), doctoral courses (three years), and junior vocational colleges (two to three years). Although special courses may also be attended at universities, these are mainly offered in special course schools.

There are more than 1,000 universities and junior colleges in China. These are categorized into two major groups. One is national universities under direct control of the Ministry of Education (the counterpart of the Japanese Ministry of Education, Culture, Sports, Science and Technology), or under direct control of each department of State Council. The other is municipal universities under direct control of each province, autonomous region, and other cities. There are also private universities, but these are quite few in number.

Among national universities, a little more than 30 distinguished universities have been appointed as "nationally important universities", which include Peking University, Tsinghua University, and Fudan University, and are leading in research, academic, and educational fields in China.

Internet universities have been started since September 1998 when the Ministry of Education approved three universities, including Tsinghua University, to experimentally establish remote education courses through the Internet. The number of Internet universities increased to 35 by 2000, and further increased to 48 as of February 2002. Many of these were established by universities appointed as superior colleges and treated favorably as "important colleges" (96 colleges) by the government. These include Peking University, Tsinghua University, Shanghai Jiao Tong University, and Sichuan University. These Internet universities are authorized to independently decide new students quota and faculties, as well as to give degrees and formal certificates to graduates from the courses.

While the number of faculties is more than 50, and the number of attendees across the nation is approximately 240,000 as of 2000, courses offered include the following four types:

- Training courses at graduate course level (no degrees are given)
- Main courses' latter term course offered to graduates from specialized courses
- Main courses
- Specialized courses

1.2.2 Vocational Education

Vocational training system in China consists of training in junior high and high school and higher training, which is offered in parallel with education in junior high, high school, and higher education institutions.

(1) Secondary vocational training

Vocational junior high schools accept graduates from elementary schools and offer education for four years. They acquire basic knowledge learned in junior high schools, and also take basic vocational training for specific kinds of jobs to be workers with a certain level of special skills.

Vocational high schools, which consist of new employee training centers, vocational high schools, and secondary special skill schools, accept graduates from junior high schools. The education period of new employee training centers is three years, and students will graduate as skilled workers. The education period of vocational high schools is three years, and students will graduate as elementary level, mid-level, or skilled engineers. The education period of secondary special skill schools is four years, from which students will graduate as mid-level engineers.

(2) Higher vocational training

Vocational junior colleges accept graduates from vocational high and high schools, to educate them for two years to become higher special skill engineers.

Concerning vocational education, the national education committee and the local government's educational agency take responsibility for development of a general plan for vocational education, comprehensive coordination, and macro-administration. The Ministry of Labour is in charge of the general administration of vocational education across the nation, under the control of the national education committee. Each administrative organization and authorized department within each industry establishes and operates vocational schools, and also guides or coordinates the administration and lectures of vocational schools within each industry. The establishment and administration of local schools is handled by enterprises, specific organizations, and community entities.

As reorganization of vocational education advances, vocational education traditionally operated solely by the government is being changed to operation by non-government organizations. In the past, new employee training centers and vocational schools, including

vocational high schools, had been established by the government, but they are currently operated by industry-related administrative authorities, enterprises, specific organizations, social entities, and private individuals that are committed to vocational education activities or facilities. Additionally, funds necessary for vocational education are not raised exclusively by the government, but also by various organizations.

Vocational education changes as market demand for workforce changes. It had been traditionally regulated by plans enforced by the government, but it is currently adjusted as required depending on changes in market demands for workforce. The Ministry of Labor is in charge of collection of information and analysis of market demands.

In addition, the vocational education pattern has been diversified, and the period of education, which used to be uniformly fixed to two or three years, currently varies to a great extent from several weeks to several years. Certificates offered are also diversified, including those for new employee training center, vocational high and secondary vocational schools, and vocational and specialized skill training institutions.

Since a competition principle is implemented in vocational training, vocational schools that successfully breed high quality students or workers may request upgrading of training courses or increased financial support. As a result, superior schools can expand, whereas inferior schools fade away. Employment, class, and wages of a worker are decided according to his/her achieved results and acquired skills.

1.3 IT Human Resources Required

1.3.1 Outline of IT Human Resources

In "Chinese Education News" dated March 20, 2002, China first revealed research reports on the national informatization level. According to this report, the total informatization level index (NIQ) was 38.46 in 2000, which was slightly greater than 30.14 in 1999. However, among all indices, the informatization human resource index is the lowest at 13.43, indicating that a shortage of human resources in IT fields is one of the factors that retard the progress of Chinese informatization

(1) Announcement of IT training criteria in 2003 (plan)

The level of companies to conduct IT technology training courses or programs will be stipulated in this criteria. Since IT human resources are insufficient in China, various companies are now offering training courses and programs for IT technology or IT certificate examination. But levels of these companies are different, and therefore, problems arise concerning quality of training courses or programs. To cope with this, the government has announced a plan to define and publicize the criteria for companies offering training, and decided to prohibit training activities of those companies that do not satisfy the criteria. This plan will be put in action from 2003.

According to Director of Educational Management Information Center in Education Technology Office, Ministry of Education, this new standard has been stipulated focusing on the capability standard of companies conducting IT training, to establish a national standard for both hardware and software needed by companies. This standard is expected to conform to the Chinese IT training market. Certain private organizations also have begun to make efforts for such standardization. For example, the Beijing Information Industry Association has already established a special committee to certify training results, in conformance to the IT training certification market in the Beijing district, to play a role in promoting education of the IT workforce.

1.3.2 Outline of IT Human Resource Education

Some examples of IT human resource education include the following projects:

(1) IT & AT Education (technology information and applicable remote training) project

In view of the shortage of IT human resources, which retards informatization in China, the education management information center in the Ministry of Education, has jointly developed with Chinese educational TV the "IT & AT Education Project" as a main part of "contemporary e-learning project". This project allows educational programs to be viewed real-time through CATV using a satellite, and also makes them available for download to personal computers. Educational programs on information technology are available to western or remote regions in China, and are expected to be national measures to educate IT workforce. Educational programs of "IT & AT Project" are mainly broadcast through VBI (Vertical Blanking Interval) channel and IP channel of Chinese educational TV.

1.4 E-Learning Market Trends

1.4.1 Outline of e-Learning Industry

Various licenses are needed to deploy e-learning within China. Some licenses may be obtained by applying to each concerned agency of the Chinese people's government, and others may be obtained from each agency/department of the local people's government. Actual operation of a business requires licenses from both central and local agencies concerned.

In the e-learning market, there are education institutions that provide educational contents, as well as IT companies that provide an e-learning platform, software/system maintenance, and funds. For example, Renmin University of China is tying up with Chinese Learning Net, the largest online educational platform provider in China. New Oriental School, which is famous for English education, provides e-learning by tying up with Legend Group, the largest IT company in China. On the other hand, certain famous colleges such as Peking University or Tsinghua University, that are capable of developing an e-learning platform, provide e-learning on their own.

e-Learning in China is divided into two types, depending on whether degrees are given or not. "Academic e-learning", a type of e-learning to give degrees, can give degrees authorized by Ministry of Education at the time of graduation. "Non-academic e-learning", a type of e-learning that does not give degrees, provides training for examinations to acquire certificates or for improvement of skills. In general, many of them are the former, which aim at academic educations, and there are many cases where they are applied in junior high schools, and secondary junior high schools, which are equivalent to Japanese high schools, and colleges. In recent days, e-learning for adults provided as a part of life-long education is increasing in number.

Academic e-learning is allowed only in schools authorized by the Ministry of Education based on regulations of this ministry, and those authorized schools have to establish a "network school" on their own to particularly provide e-learning. Beginning in 1999, authorization has been granted to initially allow e-learning to be offered using network technology at four universities which include Tsinghua University, Beijing University of Posts and Telecommunications, Zhejiang University, and Hunan University. Since then, the number of authorizations has increased to allow for 48 colleges to offer online education in more than 50 special subjects, such as economics or education.

Schools authorized currently are as follows:

Beijing	17	Tsinghua University, Beijing University of Posts and Telecommunications, Peking University, Beijing Normal University, Renmin University of China, Beijing Institute of Technology, Northern Jiaotong University, Beijing Foreign Studies University, Beijing University of Chinese Medicine, Beijing Language and Culture University, Beijing Broadcasting Institute, Central Radio and TV University, China Agricultural University, University of Science and Technology Beijing, University of International Business and Economics, Beijing University of Aeronautics and Astronautics, Central Conservatory of Music
Shanghai	8	Shanghai Jiao Tong University, Fudan University, Tongji University, Shanghai Second Medical University, East China University of Science and Technology, Dong Hua University, Shanghai International Studies University, East China Normal University
Dongbei	7	Northeastern University, Northeast Agricultural University, Jilin University, Harbin Institute of Technology, Dalian University of Technology, China Medical University, Dongbei University of Finance and Economics
Sichuan	6	Sichuan University, Southwest Jiaotong University, University of Electronic Science and Technology of China, Southwest University of Science and Technology, South Western University of Finance and Economics, Sichuan Agricultural University
Hubei	5	Huazhong University of Science and Technology, China University of Geosciences, Wuhan University of Technology, Center China Normal University, Wuhan University
Shaanxi	4	Xian Jiaotong University, Northwest Polytechnical University, Xidian University of Xi'an China, Shaanxi Normal University
Guangdong	3	South China University of Technology, South China Normal University, Sun Yat-sen University
Jiangsu	3	Nanjing University, Southeast University, HoHai University
Fujian	2	Xiamon University, Fujian Normal University
Hunan	2	Hunan University, Central South University
Shandong	2	Shandong University, University of Petroleum (East China)
Tianjin	2	Tianjin University, Nankai University
Chongqing	2	Chongqing University, Xinan Normal University
Anhui	1	University of Science and Technology of China
Gansu	1	Langhou University
Henan	1	Zhengzhou University
Zhejiang	1	Zhejiang University

Source: Announcement by Ministry of Education (February 2002)

Academic degree education currently offered is comprised of the following four levels: master's courses, courses to grant bachelor's degrees for graduates from junior colleges, courses to grant associate degrees of graduation, and courses to grant bachelor's degree for graduates from high schools.

e-Learning in China is said to suffer from a lack of lecture materials or insufficient systematization of support or administration for trainees, and therefore a more advanced quality standard or administration system will have to be developed.

On the other hand, in case no educational background certificate is required (if only skill is certified, if only certain groups within a company are covered, etc.), no authorization has to be granted by Ministry of Education. Since foreign enterprises cannot independently offer vocational training targeting at Chinese domestic companies, partnership with other local enterprises is necessary to operate e-learning businesses.

Currently, most contents provided by e-learning are focusing on English and IT areas. Contents offered by universities are created by professors, and others that relate to job capability are created by enterprises (most of them are engaged in computer and have relationship with universities). Contents delivered on e-learning have to be authorized by the Ministry of Education for those which are directly used by educational institutions, and by agencies dealing with publications for those which are used as study-aid materials. There are only a few examples of exchanging contents between colleges or taking credits from other colleges.

1.4.2 Market Size of e-Learning

As a result of interviews with more than one Chinese specialist on e-learning as well as of document research, no survey results are found regarding size of e-learning market announced by Chinese government. According to the interviews, it is revealed that some private companies may have conducted such survey, but no reputable report is available.

2. Technology: Trends of e-Learning System (Synchronous & Asynchronous)

Activities involving e-learning in China are mainly performed by universities.

China has long experience in widespread correspondence education using television and radio, such as University of the Air. So far, leading colleges such as Tsinghua University have established learning centers in various cities to conduct correspondence education. Furthermore, in response to promotion of the distance education policy lead by the Chinese Ministry of Education, major colleges have established or plan to establish "network schools" specialized in distance education, with the intention of inviting more attendees to the school.

Many Chinese IT enterprises have been incorporated based on research and surveys conducted by colleges, and therefore many e-learning vendors are IT enterprises affiliated with leading colleges including Peking University, Tsinghua University, and Fudan University.

Most of the e-learning industry in China is affiliated with such colleges, and the number of independent enterprises is very limited.

Implementation of e-learning in some major enterprises is under consideration or has already been started.

2.1 Examples of Universities

2.1.1 Fudan University

http://www.fudan.edu.cn/

Fudan University is located in Shanghai and is one of Chinese leading universities. It has abundant experience in teaching social sciences, including business administration, as well as in engineering sciences.

At Fudan University, "Virtual School 2000 Project" is promoted in cooperation with enterprises in order to materialize education that uses e-learning. It aims to construct an overall education system, including a synchronous type e-learning system, VOD, creation and administration of contents, management of attendees' records, and creation and administration of curriculum. Above all, the system to assist in the creation of contents is highly advanced, enabling automatic registration of lecturers, scribbles on a blackboard, and presentation tools.

The contents thus created are maintained in a large capacity UNIX server which is accessible to students. "Virtual School 2000 Project" implements the IP (Internet Protocol) method as the communication protocol, and is configured into a synchronous type multi-screen structure to simultaneously deliver a variety of information to lecture attendees. This project is under consideration for implementation in 6 colleges including Ningxia, Fujian, and Chongqing.

The network school (institution to provide e-learning) located in this university started as one of first schools authorized by Ministry of Education in 1999, presently has 3,200 lecture attendees and the number is projected to increase to approximately 25,000 by 2005. Synchronous systems are installed in three training facilities at locations such as Qingdao and Beijing, where the IP method is used to transmit animation video or audio information necessary for lectures to 10 classrooms.

Connections from internal LAN to outside the university use 1Mbps dedicated lines, and are to deploy e-learning in the future through asynchronous VOD, using WBT to support synchronous type e-learning.

This university owns many affiliated IT enterprises, the biggest of which is "Fudan GrandHorizon Information Technology, Inc." (300-400 employees) and is selling WBT system developed by Fudan University.

The Japanese Ministry of Economy, Trade and Industry once supported a business, which was sponsored by Toshiba Corporation, to provide distance education using a videoconference system in cooperation with Aoyama Gakuin University. Another cooperation using videoconference system was also conducted with Osaka University.

2.1.2 Peking University (Beida-online)

http://www.beida-online.com/

Beida-online is an IT venture business jointly financed by Peking University and Beida Jade Bird Group.

In July 2001, this company entered into a partnership with SkillSoft, a major enterprise in the American e-learning market. These two companies are going to jointly establish more than 480 classes for art, marketing, sales, etc., and offer lectures in Chinese, as well as internationally implement the most advanced corporate training programs. Their activities will start from establishing 25 classes given in Chinese, with an emphasis on areas which attract the highest attention in the context of employment or corporate training, such as sales, project management, human resources, etc. They plan to offer lectures using graphics and text displayed on personal computers, in addition to simulated exercises or examinations in interactive mode.

All courses are compatible with the LMS system (Lotus LearningSpace, SABA, Docent, etc.) provided by vendors that conforms to international standards, AICC and SCORM. Technology standards of AICC, IMS, SCORM, and IEEE are applied.

2.1.3 Renmin University of China

http://www.cmr.com.cn/

Renmin University of China is one of the famous colleges in Beijing. It originally focused on areas of laws and political administration, but is now a university.

Renmin University of China has established a network school at its headquarters in Beijing specifically to manage network education. This network school is a joint project tied-up with PRCEDU.COM (generally known as "Chinese Learning Net" and described later). The location of the network school is not on the campus of Renmin University of China, but on the same floor of the office building of which PRCEDU.COM is a tenant.

The network school has established off campus learning centers at various domestic regions in order to recruit students from across the nation. Students are recruited and educated through those learning centers. For example, each learning center is responsible for entry examinations for students, interviews with students for guidance on learning, round lectures of instructors belonging to Renmin University headquarters, examinations for students of each course, etc.

Students apply and take the entry examination through specified organizations located in each region. The students who have passed the examination take credits of appropriate courses (approximately 17 courses comprised of 80 credits) on their own or through a network of learning centers in specific region. They use both printed lecture materials and multimedia learning software (CD-ROM, Internet, etc.) for learning. Then, they conduct question and answer sequences or discussions through Internet, and can be provided with personal guidance if necessary. Finally, they take examinations at learning center of a specific region, to obtain degrees from Renmin University of China if they successfully obtain an adequate number of credits.

e-Learning offered by the university is mainly based on the system provided by Chinese Learning Net. This system is composed of the following three components: "lecture software", "platform to develop lecture software", and "education/educational affairs management system".

(1) Lecture software

The lecture software provided by Chinese Learning Net compresses data using special digital technology, and it is for use on the Windows (mainly IE and Media Player) platform. Its contents contain the screen, audio, and text used in lectures, which is delivered through IT machines operated by lecturers resulting in an effect as if attendees are actually in classrooms. Currently, Renmin University of China provides 35 courses for e-learning. Many of them are related to economics.

Lecture software improves learning efficiency by providing sample analysis, homework, online quizzes, and reference documents. Furthermore, printed lecture materials distributed to students are helpful for students to teach themselves as important learning subjects, keywords, and background are indicated in the materials. The question and answer function allows for interactive communication with teachers through e-mail, chat, or voice chat, and also allows for interviews for guidance as required.

(2) Platform to develop lecture software

Chinese Learning Net provides the lecture development platform, and then the university creates lecture software as described above (1), accordingly. Chinese Learning Net also provides lectures for software developers in Renmin University.

(3) Education and educational affairs management system

This system is made up of following six systems: student management, teacher management, educational affairs management, financial management, off campus learning center management, and administrator systems.

- The student management system is a system to manage various activities conducted by students over the network. It is available for registration of attendees, payment of education fees, selection of lectures and lecture materials, submission of questions on problems, reservations for examinations, confirmation of study records, etc.
- The teacher guidance system is a system used by teachers. It is available for acknowledging the progress of students learning, for obtaining information on lecture plans or lecture materials, etc.
- The educational affairs management system is available for allocating attendees, instructors, specialization and lectures, and also for managing lecture materials, homework, school records, educational certificates, etc.
- The financial management system is available for managing funds.
- The off-campus learning center system is available for instantaneously acknowledging the status of student recruitment and progress in educational activities. Information is transmitted to the management system in the network school and headquarters, and in turn, these provide each learning center with support through a synchronous function.
- The administrator system is equipped with various functions including identification of network administrators, authorization, revised information registration, etc.

2.1.4 Tsinghua University

http://www.tsinghua.edu.cn/

Tsinghua University is a Chinese top-level university and is famous for its science and technological faculty.

It offers distance education through a network school, and also many distance educational programs using satellites. It is also committed to technological development of asynchronous type WBT.

It also has experience in distance lectures using a videoconference system with foreign colleges including Waseda University.

2.1.5 Beijing University of Posts and Telecommunications

http://www.bupt.edu.cn/

This university uses asynchronous technology (ATM: Asynchronous Transfer Mode) to execute high-speed transmission of a combination of all audio and video information to more than 100 classrooms. This system is capable of collaborative learning such as discussions across the classrooms, but for the time being offers one-way delivery of lectures.

For WBT, there is not yet much content available, and animation video is delivered primarily based on textbooks. Development of another system, which is necessary to provide for management of learners and examinations, is in progress. Teachers create most of its content, and 95% of this is in Chinese.

2.1.6 Beijing Foreign Studies University

http://www.bfsu.edu.cn/

This university tied up with both domestic and foreign enterprises leading the Internet industry, and established an Internet educational institution in 2001 by implementing an Internet learning platform. Students can obtain certificates for educational background degrees that are issued by Beijing Foreign Studies University and authorized by the nation, if they successfully obtain adequate credits within five years.

2.1.7 Beijing Normal University

http://www.bnu.edu.cn/

This was one of first e-learning model schools authorized by Ministry of Education, and is approved to offer certificates for graduation and degrees. This university has established 23 off campus education stations in various regions, and starting from 2001, students can study Chinese linguistics, Chinese literature, kindergarten education, education administration, contemporary education technology, etc., at such regions as Beijing, Jiangsu, Guangdong, Fujian, Ningxia, Qinghai, and Shandong.

2.1.8 Northeastern University

http://www.neu.edu.cn/indexm2.htm

This university constructed the "DongBei e-learning system" in partnership with Shenyang telecommunications in September 2001. This system is installed in Northeastern University, which is the central location, as well as in 22 remote classrooms in colleges and junior high schools at Lianing, Hebei, Shanghai, and Guangdong. The system is compatible with both synchronous and asynchronous e-learning systems.

(1) Synchronous

The synchronous system is linkable to remote classrooms via a videoconference function. The contents of lectures are saved for later creation of lecture materials.

(2) Asynchronous

The asynchronous system, which was established centrally for overall management, is connected to each remote network for processing. A database, file server, BBS server, and software plug-ins are centrally managed by a main server which exchanges information at the speed of 100Mbps. Additionally, it is linked to file servers located at distance education classrooms to distribute contents. Distant classrooms have constructed networks of their own, preventing the main server from suffering from an excessive workload.

2.1.9 Neusoft Institute of Information on Technology

This is an educational institution established as a part of Northeastern University in June 2000, the funds of which were raised by Neusoft group. Its goal is to breed software engineers, besides offering adult training in addition to each associate, bachelor's, master's, and doctorate course. The e-learning research & development center, on the other hand, conducts technological development.

In addition to lectures in classrooms, some lectures contain e-learning and issue certificates for acquisition of credits. Contents from providers including Smart Force and Toshiba are utilized as e-learning materials.

2.1.10 Northern Software Institute*

This is an educational institution established with funds raised by Shenyang Institute of Aeronautical Engineering, Global Envoy Software, and Chenfei Company*. It recruits students in the third grade of college who have specialized knowledge and intend to learn IT, and then admits those students when they have advanced to the fourth grade to educate them. e-Learning lecture materials used were developed by Toshiba, while Japanese language education and Japanese style quality control are highly valued. Toshiba's lecture materials are used for students with a high level of Japanese ability, whereas support tools, in which the e-learning system includes the features of a Japanese-Chinese dictionary and translation, are used for other students. The support tools are developed by Global Envoy Software, a software company.

2.2 Examples of Enterprises

2.2.1 PRCEDU.COM (Chinese Learning Net)

http://www.prcedu.com
PRCEDU.COM is an enterprise that provides "Chinese Learning Net", the biggest Chinese online educational platform provider, and educational contents.

It ties up with Renmin University of China and HoHai University to develop educational contents, and makes efforts to construct ASP services and LMS systems.

Services it supplies are as follows:
(1) It provides e-learning service over the Internet (for educational background e-learning, it provides the platform, while the university provides the contents. For non-educational background e-learning, it provides the platform and contents).
(2) It develops network educational software.
(3) It cooperates with other companies including Intel to experimentally provide network education for educational institutions or enterprises.

"Chinese Learning Net" provides Renmin University of China with educational ASP, and also offers services such as lecture software, a system to recruit students, construction of a virtual campus, a network communication platform, and a service management platform for the entire nation.

2.2.2 Shanghai Jiaoda Withub*

Shanghai Jiaoda Withub* is a joint-stock enterprise established through authorization of the government of Shanghai, and is operated by the president of Shanghai Jiao Tong University and its professors. This enterprise uses the technological capability and expert knowledge of that university to develop and research network security systems, as well as to provide

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* This indicates that it may not be the official English title for the company, product, or etc.

commercial application solutions. It has set to work on e-learning since March 1999, and has started to provide each elementary and junior high school in Shanghai with e-learning systems which are installed at 20 locations including schools in Shanghai and vocational training centers. The sales revenue in 2001 was approximately 100 million yuan, which is a 200% increase from 36,130,000 yuan in the previous year. It listed stocks on the Hong Kong GEM in August 2002.

2.2.3 TOL24 (Internet Lecture of New Oriental School)

http://www.tol24.com/

New Oriental School is a famous English teaching private school in China. It was established in 1993, and more than 500,000 people attended its courses during 8 years. Approximately 70% of Chinese students studying in the USA have attended English courses of this school. It admits more than 150,000 attendants a year, making up more than 70% of English learning market in China. However, its classrooms can only accommodate 30,000 attendants. To cope with problems of many people who cannot attend the classes due to their duties, it has cooperated with Legend Group Ltd., the largest Chinese IT enterprise, starting from December 2000, to establish an e-learning project "net-class" which uses networks. Use of "net-class" enables attendance of lectures on personal computers.

Attendees may select courses according to the contents or lecturers they prefer from among various programs, such as courses to prepare for TOEFL, GRE, and GMAT examinations, or courses to improve linguistic capability. Attendees of network classes can use special software to listen to the teacher while viewing what's written on a blackboard over the network. Any question can be sent by e-mail and will be answered within 24 hours. Online examinations are available to attendees to evaluate their own ability. Furthermore, a "short message class" is also offered. This e-learning class uses cellular phones to teach words/phrases for preparation for TOEFL, GRE, and GMAT, or provide the latest information on learning in foreign countries.

2.2.4 Shanghai Baosteel Group Corporation Corporate Training Center

This is an organization to mainly provide training to adults living in the Shanghai district. This center accommodates Baosteel Continuing Engineering Educational Institute to train engineers, Baosteel Economic Management Training Institute and Baosteel Political Studies School to train enterprise executives and management staff, and Baosteel Advanced Training School of Technicians and Baosteel Vocational Skill Proficiency Assessment to train workers with special skills and advanced skills. Baosteel Research Institute Branch in Northeastern University and Baosteel Research Institute Branch in University of Science and Technology Beijing have also been established to cooperate with leading enterprises to conduct research and development.

This center provides courses mainly focused on vocational training to satisfy the needs of adults, using bi-directional synchronous e-learning or WBT with VOD applied through Internet or intranet.

Some of the contents provided are created at the center, and others are supplied by universities within China and used together.

2.2.5 Beijing Lawyer Office

Chinese license for a lawyer must be updated after acquisition by obtaining degrees of universities or by attending training courses. Training has been made available using e-learning since 2002. The lawyer association issues individual certificates based on ID cards distributed to each lawyer, and can maintain personal training records or training history.

2.2.6　Chinese Contemporary e-Learning Satellite Broadband Multimedia Platform

Chinese contemporary e-learning broadband multimedia platform has been started since November 2000. When this platform was provided, Chinese satellite TV education had achieved the conversion from analog to digital technology.

This platform provides eight TV channels, eight audio channels, and an additional 20 channels to broadcast IP data, which enables the audience to use cable TV to select more than 30 e-learning programs. It is also capable of exchanging data with the China Education and Research Network, and therefore it can provide e-learning to western regions of China.

3. Advanced Activities

3.1 Next Generation Learning Infrastructure such as Collaborative Learning

"Chinese E-Learning Technology Standardization Committee (CELTSC)" (described later), which is a subsidiary division of the Chinese Ministry of Education and is promoting standardization of e-learning technology, has established a subcommittee concerning collaborative learning (CELTS-16). However, specific details are unknown.

3.2 Quality Standard: Quality Standards of Contents and Services

Some e-learning courses of network schools promoted by various colleges are said to be poor in support system, due to efforts made to rapidly increase the number of attendees, and there are many arguments made about the quality. Consequently, the Ministry of Education has developed policies to maintain the quality. Refer to 4.2.1 (2) for details.

4. Government Policy and its Vision (Mid- and Long-term Direction)

4.1 Status of IT policies

4.1.1 Overview

The Chinese government has been attaching importance to science technology education as a basis for national development under the slogan of a "science education nation".

As a result of "9th five-year plan (1996-2000)", the following was announced in May 2001:

- The place of information industry in national economy has been upgraded.
- Communication infrastructure rapidly evolved and quality of services has been improved.
- The market for electronic information products has rapidly grown.
- The ratio of domestic production of communication facilities has been improved.
- Important technologies for electronic products as well as software industry have been developed.
- The national economy and social informatization have been developed.
- A system to control market and legal arrangements has been developed.

The plan mentioned above was followed by the "10th five-year Plan (2001-2005)" which was announced in October 2000. This plan aims to perfect the high-speed networks. The Ministry of Information Industry expects that, during this plan, the number of subscribers to cellular phone will increase by 26% each year in China, and the number will reach approximately 300 million by the end of 2005. Its main goals are as follows:

- To promote digitization and implementation of networks in governmental and civil areas.
- To further develop communication infrastructures.
- To help the central information industry grow.
- To reinforce security systems for information networks.

4.2 E-Learning Related Measures as Part of IT or Educational Policies

4.2.1 Overview

(1) Positioning of e-learning from the viewpoint of policies

Higher educational institutions in China are committed to education using e-learning as a measure to solve problems such as an insufficient number of colleges compared to population, or difference of education between coastal and inland regions. In "Plan for promotion of education for 21st century" in 1998, it was announced that, as one of the measures to alleviate the shortage of educational resources (shortage of educational institutions compared to population), "Project for contemporary e-learning" would be started, human resources would be educated using e-learning, and the level of education would be improved.

It also stated that network education would be promoted as a part of lifelong education, aiming at constructing an open educational network. According to the announcement of the Ministry of Education, the number of college students who are attending e-learning using the Internet in China has exceeded 400,000 (as of September 8, 2001).

The Ministry of Education, on the other hand, is determined to invest to develop e-learning in the western region as a part of the strategy for large scale development of the western region, and already has invested 70 million yuan to construct an e-learning

infrastructure and network in the western region. It promotes the "Project for expansion of education and research network in the western region" to allow every school in the western region to connect to the Internet, and is planning to construct CERNET (China Education and Research Network) at the ministry level. Furthermore, it promotes the "Plan for university campus network in the western region" to construct campus networks at colleges in the western region in three years, while it also promotes the "Project for partial elementary and junior high schools network norm" aiming at development of education using information technology at elementary and junior high schools in the western region.

(2) Standardization of quality of e-learning

In view of the expansion of e-learning in China, the Ministry of Education announced "Recommendations for enhancement of control on network education schools in universities to improve quality of education" in July 8, 2002 (http://www.moe.edu.cn/wreports/index_no.htm). This regulates how network schools are controlled, to allow for smooth operation of network education activities in colleges, as well as for maintenance of the quality of education offered.

Details are described below:

(a) The roles of correspondence education organizations are re-confirmed.

Their goal is the lifelong education for adults, to contribute to the lifelong education system, in addition to advancement of networking in China.

(b) Effective policies are enacted, and quality is maintained for correspondence education organization.

- Advertisements and publicity of each educational organization are unified - only authorized educational organizations are allowed to run publicly, and any exaggerated advertisements are prohibited.
- Controls on the contents of education are reinforced. Quality of lecture materials, databases, and platforms are maintained. Teachers are also educated.
- Examinations are strictly controlled. Problems such as cheating in examinations are prevented, and those who have violated the rules are punished.
- Obtaining credits is flexibly handled. Credits are made available for students to obtain in accordance with their plan.

(c) Educational and public service systems are jointly constructed.

(d) Annual wage system is implemented in each e-learning education organization.

An internal inspection system is established, and reports to the Ministry of Education once a year are obligatory, in order to maintain quality.

(e) Chinese western region is particularly supported, to help its development.

(3) Legislation of "Standardization of information for education management"

The Ministry of Education developed "Standardization of IT for educational control" in 1999, to enable every school and educational agency in the nation to freely exchange information under the leadership of the Ministry. This policy is composed of the following 4 sections:

1) Standards for school management information (standardization of the system in internal school management department)
2) Standards for management information of management department in educational administration (standardization of the information system between Ministry of Education and schools)
3) Standards for exchange of information (standardization of all information exchanged)
4) Standards for designing administration software

As of September 2002, standards for school management information have already been in effect in Sichuan and Chongqing, and the next step is to establish an authorization system regarding educational software to allow for compatibility of software among different organizations. Software is developed by Beijing Hua-na Shen-long Educational Science & Technology Development Co., Ltd*.

The Ministry of Education established Resource Construction Committee for Modern Distance Education of Ministry of Education and the National Expert Group of Resource Construction on Distance Education of Ministry of Education in September 1999.

4.2.2 Policies and its Details

The Ministry of Education established Resource Construction Committee for Modern Distance Education of Ministry of Education and the National Expert Group of Resource Construction on Distance Education of Ministry of Education in September 1999, which are organizations to effectuate and manage rules and policies to ensure the quality of Chinese e-learning.

"Resource Construction Committee for Modern Distance Education of Ministry of Education" establishes guidelines, policies, and technological norms to encourage the construction of contemporary distance education resources and manage educational resources, and also has the role of making important decisions regarding the construction of distance educational resources. The National Expert Group of Resource Construction on Distance Education of Ministry of Education provides Resource Construction Committee for Modern Distance Education of Ministry of Education with technological consulting, effectuates and announces specific technological standards on resource construction, and has the role of approving quality and quantity of educational data and courses of various distance education.

"Socialized Distance Learning Public Service System", a national level e-learning system project, was started in October 2002. This system provides college distance education with services for administration and operation, in view of problems of administration and education quality as well as waste of resources dispersed over a vast area, resulting from the recent increase in the number of e-learning attendees. The first service organization, "Aopeng Distance Education Center*", was established in Beijing to provide this system on October 15, 2002.

From now on, these public services will be useful to aim at integrated standardization of e-learning platforms for both hardware and software.

4.2.3 E-Learning Related Organizations

Listed below are committees, which are subsidiary to the Chinese Ministry of Education and comprised of college lecturers specialized in standardization technology:
(1) Chinese E-Learning Technology Standardization Committee (CELTSC)

Science and Technology department of Chinese Ministry of Education established Contemporary Distance Learning Standardization Committee, as soon as DLTS (Distance Learning Technology Standards) was started. This committee was renamed to CELTSC (Chinese E-Learning Technology Standardization Committee) in December 2001, and the standard already distributed as Distance Learning Technology Standard (DLTS) was also renamed Chinese E-Learning Technology Standard (CELTS).

This committee is an organization aiming to work on standardization of resource sharing, storage format of contents, and compatibility of system operation, based on the existing circumstances in China and in consideration of trends of international standardization of

distance learning. Long-term goals for this committee are: to create a standardization research team for informatization education which will provide appropriate capability through contemporary distance education standardization projects, and to be able to cope with future competition and cooperation.

Having checked international standards, CELTSC created a standard system for Chinese informatization education, specifically referencing a standard called IEEE1484. According to this plan, the standard system of Chinese informatization education will be deployed on the basis of 8 phases including general standards, standards for educational resources, standards for learners, standards for educational environments, standards for quality of educational services, standards for localization (translation to Chinese), follow-up research issues, and a support system for standards development. This plan also specifies 30 different sub-standards and the priority to execute them. The committee aims to first distribute these standards experimentally, and then have them applied to distance education activities operated nationwide. Each committee consists of from a few to just over 10 members, mainly ones who are related to colleges. Each subcommittee is held sequentially by any one of the members at places scattered all over China.

The experimental standard already distributed by the committee is comprised of following 11 items:

CELTS-1   Architecture and reference model
CELTS-2   Glossary
CELTS-3   Learning object metadata
CELTS-9   Content packaging
CELTS-10   Question and test interoperability
CELTS-11   Learner model
CELTS-13   Student identifiers
CELTS-14   Achievement definition
CELTS-17   Platform and media profiles
CELTS-20   Learning management system
CELTS-31   Educational resource construction norm

Table 4-1 Standardization System of CELTSC

Type of Standard	Sub-standard (number)	International standard to be referenced	Priority
General standards	Architecture and reference model (CELTS-1)	IEEE 1484.1	***
	Glossary (CELTS-2)	IEEE 1484.3	***
Standards on educational resources	Learning object metadata (CELTS-3)	IEEE 1484.12	***
	Semantics and exchange bindings (CELTS-4)	IEEE 1484.14	***
	Data compatibility protocol (CELTS-5)	IEEE 1484.15	***
	HTTP binding (CELTS-6)	IEEE 1484.16	***
	Courseware compatibility (CELTS-7)	IEEE 1484.10	***
	Curriculum arrangement (CELTS-8)	IEEE 1484.6	**
	Content packaging (CELTS-9)	IEEE 1484.17	***
	Question & test interoperability (CELTS-10)	IMS QT	***
Standards on learners	Learner model (CELTS-11)	IEEE 1484.2	***
	Task model (CELTS-12)	IEEE 1484.4	**
	Student identifiers (CELTS-13)	IEEE 1484.13	**
	Academic achievement definition (CELTS-14)	IEEE 1484.20	*
	How to write quality of lifelong learning (CELTS-15)	IEEE 1484.19	*
	Collaborative learning (CELTS-16)	ISO ALIC	**
Standards on educational environments	Platform and media profiles (CELTS-17)	IEEE 1484.18	**
	Tool/agent communication (CELTS-18)	IEEE 1484.7	*
	Corporate portal (CELTS-19)	IEEE 1484.8	*
	Learning management system (CELTS-20)	IEEE 1484.11	***
	User interface (CELTS-21)	IEEE 1484.5	**
Standards on quality and quantity of education services	Education resources evaluation (CELTS-22)	ASTD-ELCS	**
	Education environments evaluation (CELTS-23)	Q0S	*
	Management of quality of education services (CELTS-24)	ISO9000	*
Localization (conversion to Chinese)	Localization norm (CELTS-25)	IEEE 1484.9	**
Follow-up research issues	Virtual experiments (CELTS-26)		*
	Adaptive learning (CELTS-27)	NIST-ATP/ALSFP	*
	Upper level ontologies of standards (CELTS-28)	IEEE SUO	*
	Contents ranking (CELTS-29)	W3C-PICS, RSACi/ICRA	*
	Learning management information system (CELTS-30)		*
Support system for development of standards	Websites of CELTSC	www.CELTS.moe.edu.cn	***

Note1: NIST-ATP/ALSFP: Project as an "Adaptive Learning System Focused Program" based on United States' national standards and Chinese technology agency's high-technology plan.

Note2: Priorities are decreasing from the highest ***, to **, and then to the lowest *.

Source: CELTS Website

The following are main activities in the latter part of 2002:

(a) CELTSC made amendments to the standards already distributed in June 2002.

In accordance with the progress of research on standardization of network education technologies and diffusion of the standards, CELTSC revised the standards system in June 2002. This amendment has removed four sub-standards such as the existing HTTP bindings, and added the interoperability norm for education management information system operation (CELTS-40), the education resource construction norm (CELTS-41), and two other applicable norms, and also added CELTS-42, a basic education metadata application norm developed by Basic Education agency (which was announced on October 10, 2002, as previously mentioned). For the convenience of users, CELTSC divided all standards into three types including fundamental standards, adaptive standards, and follow-up research issues, from the viewpoint of applicable area of each standard. The fundamental standards are further divided into three types including information models, practice navigation, and approval norms.

(b) At IEEE-LTSC/ISO-SC36 Conference in September 2002 (held by University of Kansas in the U.S.A.), chairman of CELTSC brought forward the Chinese "Platform and Media Profiles Standardization", which was then approved.

http://www.edu.cn/html/keyanfz/doc20020210/11.doc

This standard is one of those relating to educational environments announced by CELTSC, and its goal is compatibility of platforms (browser, OS, etc.) for existing educational systems. This standard stipulates how to describe basic technological characteristics of educational systems, creates standard profiles and groups of standard profiles, and facilitates educational resources to be used by technology development enterprises, resource providers, and users.

(c) Chinese E-Learning Technology Standardization Committee of Ministry of Education announced "CELTS-42: Standard for basic education resource metadata" on October 10, 2002.

http://www.celtsc.edu.cn/news/metadata.htm

This standard is an educational resource metadata standard for fundamental education. CELTSC has developed catalogs to define metadata for fundamental educational resources, so that schools, enterprises, or organizations which make use of metadata, as well as individual users, may promptly and efficiently search for necessary educational resources from the national fundamental educational resource databases and portal sites. This standard has been established based on "CELTS-3 Learning object metadata: Standard for information model", in conformity with the standard for course establishment in compulsory education, which had already been announced by the Ministry of Education. It also made reference to DCMES (Dublin Core Metadata Initiative), and to methodologies for sorting vocabularies including "Chinese Library Classification*", GEM from the U.S.A., and EdNA from Australia. This standard also made references to international standards including ISO, ISO/IEC, ANSI/NISO, MIME, DCMI, TNG, and XML. This standard enables resource sharing.

The committee will host the ISO/IEC JTC1 SC36 conference in Beijing in September 2003. Their involvement in international standardization technology of e-learning is expected to progress further.

4.3 Laws Regulating Rights for Intellectual Property and Personal Information in e-Learning

4.3.1 Protection of Personal Information

In the article 12 of "regulations to control Internet electronic advertisement services" which were approved on October 8, 2000, at the fourth internal affairs conference of the Ministry of

Information Industry and enacted on November 7, it is stipulated that "electronic advertisement service providers must protect security of personal information on users connecting to Internet, except for those that are defined specifically by laws". In article 19 of the same law, it is also stipulated that "anyone who illegally reveals personal information on users connecting to Internet without prior agreement from those users will be subject to revision for which administrative organizations for telecommunication of Ministry, self-government district, or directly controlled cities will be responsible, and anyone who causes damages or losses to users connecting to Internet will take legal responsibilities based on applicable laws".

4.3.2 Intellectual Property Rights

Intellectual property rights on e-learning contents will be protected if licenses are obtained from the authority involved such as the Ministry of Education, and databases are also protected based on software protection laws.

Standing Committee of National People's Congress in October 2001, revised trademark law and revised copyright law were approved. Revised copyright law was effectuated from December 1, 2001, which covers contents in addition to databases, reinforces software protection, and stipulates penalties clearly.

In "resolution to protect Internet security" adopted at tenth conference of Standing Committee of the 9th National People's Congress in December 2000, article 3 stipulates that "in order to protect socialist market economy and social administration discipline, those who have conducted following acts which constitute any crime will take legal responsibilities in the context of regulations defined by criminal laws", and sub-article 3 of article 3 defines that "those who have used Internet to infringe other's intellectual property rights".

4.4 Vision

In the "10th 5-year plan" between 2001 and 2005 for education issues the Chinese people's government declared that informatization in education will be attached great importance. (http://www.moe.edu.cn/news/2002_06/3.htm)

"Education informatization project", which is a part of this plan, places emphasis on the policy of contemporary e-learning construction based on the Chinese Education and Research Network and satellite TV systems. Its objectives are to establish many network schools, to improve college network environments, to establish public service systems such as digital libraries, and to complete college informatization environments.

Informatization will be promoted, for example, to enable all domestic colleges and high schools as well as a part of elementary and junior high schools to connect to the Internet by 2005. Information technology will be implemented as one of compulsory curriculums at all schools superior to junior high schools in the nation. Computer classrooms will be established in each school, and educational TV programs will be made visible at almost all rural areas in China.

4.5 International and National Conference

Large-scale conferences for e-learning in China include the following:
(1) China Distance Education Development Forum 2002
- Date: October 2002
This forum was held in Beijing for domestic participants.