e-Learning Education System on Web

Sung Choi*, Jung Lan Han**, Jimoon Chung*

Contents

Key Words:E-Learning, cyber education, distance learning, Web based, information service

Abstract

Within the rapidly changing environment of global economics, the environment of higher education in the universities & companies, also, has been, encountering various changes. Popularization on higher education related to lifetime education system, putting emphasis on the productivity of education services and the acquisition of competitiveness through the market of open education, the breakdown of the ivory tower and the Multiversitization of universities & companies, importance of obtaining information in the universities & companies, and cooperation between domestic and oversea universities, industry and educational system must be acquired. Therefore, in order to adequately cope with these kinds of rapid changes in the education environment, operating E-Learning Education & company by utilizing various information technologies and its fixations such as Internet, E-mail, CD-ROMs, Interactive Video Networks (Video Conferencing, Video on Demand), CableTV etc., which has no time or location limitation, is needed.

* Dept. of Computer Science Namseoul University.
** Dept. of MIS, Hyupsung University, sstar@nsu.ac.kr

I. The Necessity of E-Learning System

Using information and telecommunication technologies, especially the Internet is expected to bring about many changes in the social, economics and educational area. Among the many changes scholars have predicted, the development and fixations of Distant Learning or E-Learning Education was the most dominant factor.

In the case of U. S. A., E-Learning Education has already been established and in under operation by the Federate Governments of 13 states. Any other universities (around 500 universities has been opened until now), with the help of the government and private citizens have been able to partly operate the E-Learning Education and is planning on enlarging step-by-step in the future. It could be seen not only as U. S. A. trying to elevate its higher education through their leading information technologies, but also could be seen as their objective in putting efforts on subordinating the culture of the education worldwide. UTRA Education in U. S. A., for example, is already exporting its class lectures to China, and Indonesia regions.

This form of Distant Learning goes beyond the walls of universities and is in the trend of being diffused in business areas or in various training programs of financial organizations and more. Here, in the hope that this material would some what be of help to other Universities which are preparing for E-Learning Education, I would like to introduce some general concepts of the components forming E-Learning Education and Open Education System which has been established by National Education. System of E-Learning Education could be seen as a general solution offered by the computer technologies for the management on the students, Lectures On Demand, real hour based and satellite classes, media production lab for the production of the multimedia Contents, electronic library, the Groupware enabling exchange of information between students and professors. Arranging general concepts of components in the aspect of E-Learning Education and Open Education, it would be expressed in the form of the establishment of E-Learning Education and the service of Open Education as can be seen in the diagram below.

II. Framework of e-Learning Education

Figure 1, Full Configration of E-Learning system

Figure 1, Full Configration of E-Learning system
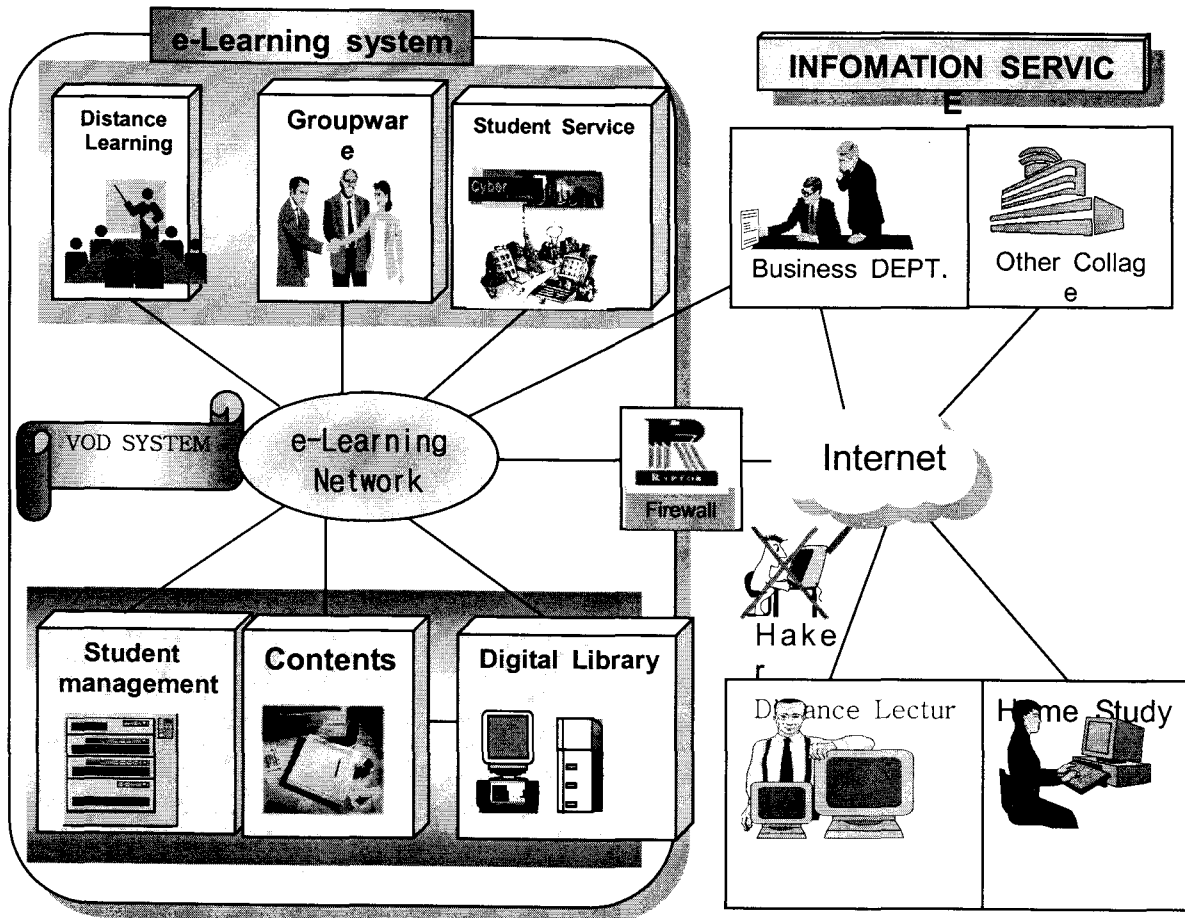
The organization of Solution for the operation of E-Learning Education is consists of Distant Learning System, Groupware System, Student Information Service System in the organization field for carrying out the Distant Lecture, Student Management System, Business Management System, Digital Library System, Contents Building Area in Solution Area for operating E-Learning Education and these, not only, support in enabling Distant Lecture and Home Study, but also enables the exchanges of credits between colleges.

E-Learning Education and Open Education System established through coordinating the technologies of Hardware, Software, Network is produced by Internet Lecture or LOD (Lecture On Demand) and through the service of internet or inner LAN (Local Area Network) the Distance Lecture and Home Study on E-Learning Space has come to reality.

The classification of the general functional elements of Solution is as follows:

285

Ⅲ. e-Learning OF THESIS

As the problems of unemployment have become the centre of government policy debates, the Korean government, as in other countries, has offered the highest priority to the promotion of employment. However, the desirable establishment of the employment policies depends partially on the clear understanding of the changes in employment patterns such as full-time or part-time work and permanent or temporary employment. Although the current Labour Force Survey has been the most important and timely source of the statistics of the economically active population, the statistics of underemployment have also been required in order to completely describe the quantity and quality of the labour market provided by a society. The main purpose of this research is to obtain some ideas for the improvement of the measurement of underemployment, mainly focusing on the term *time-related underemployment (visible underemployment)*.

In order to recognise the scope of the survey and data quality, statistical efficiency and cost in measuring underemployment, we have reviewed in Education Centers 2 and 3 the results of other research, the most recent international standards and the current applications in other national statistical agencies. According to the three criteria developed by the International Labour Organization, to be classified as underemployed, persons should have been 1) *working less than the regular duration*, 2) *doing* so *involuntarily* and 3) *seeking or being available for additional* work, during the reference period. Based on these criteria, in Education Center, we described a model for the measurement of underemployment with two alternative definitions, a *longer term view* and a *shorter term view* and the two definitions of underemployment were designed into a single questionnaire. This questionnaire was improved using pretesting. In Education Center, we reviewed the concepts and measurement methods of the survey and data quality in terms of errors. The pilot sample survey was conducted with about 6,000 respondents in Korea in July 1999 and described in Education Center.

The results of the pilot sample survey have been analysed in several ways as follows:

First, the relationships between the data of *duration of the interview* and the other variables were investigated in Education Center. According to the results of the investigation, while the gender of the respondents does not affect the length of the interviews, the data of duration of the interviews show some variability between

the main activity and age groups of the respondents. The second and third visit times showed little difference in variability from the first visit times. Hence, we conclude that duration of the interviews can be influenced by the main activities and age of the respondents and the outcomes of the visits. Using the results of these analyses, it is possible to predict the entire time taken for the full survey.

Second, we also examined in Section 7.3 the results of the survey using the two alternative definitions of underemployment . Although the age of the respondents has an insignificant influence, the gender of the respondents has a significant influence. Similarly, the two groups of the relationship to the household head, *Spouse and De Facto*, mostly female respondents, are influenced by the different definitions of underemployment. The results of the analysis also show that when the longer-term view of underemployment is used for the overall survey, the underemployed persons were likely to affirm their underemployed status than when the shorter-term view of underemployment was used. It is hypothesised that a longer interviewing time enables the respondents to understand clearly the concepts and answer the questions accurately up to the end of the questionnaire. Additionally, it is hypothesised that the underemployed status of the respondents can be identified more clearly when the longer-term view of the

definition is used than when the shorter-term view of the definition is used.

Just as there is some variability between the two alternative definitions of underemployment, the estimates of the results may also have some variability due to sampling and missing data. The results of the sample survey were post-stratified using the existing data of the population census in Section 7.4. As a result, the self-weighted average of the interview time was a little less than the post-stratified data by the weight of age groups of the population. In addition, the underemployment rate weighted by the results of the population census was slightly lower than the underemployment rate by the self-weighted estimate of the pilot survey. For the official statistics, in particular, the post-stratification method is useful as a means to reduce the variance of sample surveys by utilizing the existing administrative records for statistical purposes.

In Education Centre, in order to characterise the costs and benefits in the pilot sample survey, the non-responses, as one source of error, were analysed by comparing the estimates between the whole group of respondents, the respondents at the first visits and the respondents later. As a result, two variables, the industries and main activities of the respondents, show some variability between the two groups, the respondents at the first visit and the respondents later, while the other variables

have little effect on the sample estimates. Using the sources of non-response errors in the pilot sample survey, the cost of the interviewers' salary spent in the field were recalculated into the groups of respondents depending on the status of visits, showing that almost 40% of the total cost was used to reduce the non-responses. Therefore, we can decide whether to use the budget for the non-response follow-up in revisiting the sample households or to reallocate this budget to improve the quality of the survey data. Based on the examinations of the impacts of the non-response on the estimates in the pilot sample survey, an optimal allocation model of a fixed budget can be considered in order to improve the cost-benefit effects.

Lastly, we have examined some modern computer techniques for the improvement of the quality of the survey data in Education Centre. Several countries such as the USA and Canada have introduced and tested the mixed mode of Computer-Assisted Telephone Interviewing (CATI) and Computer-Assisted Personal Interviewing (CAPI) in the Labour Force Surveys, having implemented the new mode and solved many difficulties in the practices. The practice of CATI in the Queensland Government also provides some ideas in developing a new interviewing method for the measurement of underemployment. Recently, the telephone coverage in Korea has increased, the telephone survey mainly

based on CATI is more likely to succeed. For the introduction of CATI for the Korean Labour Force Survey, several administrative issues should examined and determined, such as centralisation or decentralisation of the CATI facilities, monitoring strategies and the application of the mixed mode of CAPI and CATI.

To sum up this thesis, we have discovered and discussed several application methods for the three criteria of underemployment, following the review of the basic concepts of the Labour Force Survey based on the international standards. Based on the results of these reviews, the two alternative definitions for the measurement of underemployment were conceived and applied to modelling the classifications of underemployment and to designing a new survey questionnaire for a pilot sample survey. In order to improve the quality of the survey data, we also discussed the sources of survey errors such as interviewers, respondents, questionnaire and the data collection mode. Finally, the collected data from the field survey have been analysed, mostly based on aspects of the data quality, including the duration of the interviews, the results of the alternative definitions of underemployment and the impacts of the non-responses of the survey.

Based on the results of this research, we now make some recommendations for the future development in measuring time-related underemployment in the current

288

Labour Force Survey in Korea.

1) Use the longer-term view for the definition of underemployment in order to facilitate the recognition of workers as underemployed, including:
   - Defining of the regular hours of work according to the respondents' understanding with supplementation by the Korean Labour Standard Act;
   - Using longer time to desire and look for more hours of work, for example, during the last four weeks; and
   - Using both the past and the future for the availability for additional work desired, for example, either during the last week or within the next four weeks or six months.

2) Add new measurement issues of underemployment on the current questionnaire, including:
   - Putting a work-diary in measuring the actual hours of work;
   - Taking into account the concepts of multiple job holding and overtime/leave time; and
   - Specifying additional work desired such as type, location and industrial/economic sector.

3) Enhance the quality process for questionnaire design by:
   - Repeating the pretesting process for a designed/redesigned questionnaire with a small group of people, such as interviewers' observation and debriefing by the respondents; and
   - Conducting and analysing a pilot sample survey with a relatively large group of people in order to obtain ideas for the improvement of the questionaire and survey management.

4) Improve interviewing methods using modern computer techniques by:
   - Introducing the mixed mode of Computer-Assisted Telephone Interviewing (CATI) and Computer-Assisted Personal Interviewing (CAPI) methods in the current Labour Force Survey as well as in the new measurement of underemployment.

A. Distant Learning System

Contents Building and Distant Learning is the core elements in operating E-Learning Education. It is the process of notifying his / her Lecture Contents for the Distant Lecture on the internet. Here, the lecture contents are produced through the multimedia production lab according to the course plans and also the information of research papers or books which could be referred to related on the e-Learning lecture, could be notified. If necessary, the contents of the lecture could be changed and deleted at any time.

INTRA 21 supports various kinds of production, supply, operation and

termination of the contents of the lecture and the contents prepared by the multimedia appliances such as, Word Process, Power Point, HTML Editor Multimedia are also available for notifying in standardized materials and its management is provided.

Distant Learning enables Home Study for the E-Learning Education students without the trouble of time and location limitation. A student can study whenever, and wherever he / she prefers by the internet. Carrying out the Home Study, if necessary, the contents produced by E-Learning Education Center through LOD (Lecture On Demand) System could be provided.

B. Student Management System

General Survey of the courses lectured in E-Learning Education is notified through the internet enabling students to choose their courses. Advertisement on E-Learning Education, registration through internet is also available.

If registration for E-Learning Education is requested, registration at the E-Learning Education Center in person together with the online registration through the internet is preferable. However, after the approval of registration, registering for the courses are admitted only to those who have completed paying the tuition fee.

Courses at E-Learning Education are introduced only to those who have been approved for the enrollment and other various information needed for the registration of the courses are provided.

The Student Management System is different from the management system processed by utilizing the pre-existing Student Management System. A Different kind of management system is developed for the particular use of E-Learning Education. This system should be organized in a way that information on students' academic record and personal records of both students' and professors' could easily be exchangeable in order to bring reality to the E-Learning lectures. Furthermore, student academic records, after the completion of the course, is organized for receiving information from the Distant Learning system and is recorded through the Student Management DBMS.

When Student Management System, once, is established, enrollment, registration for the courses, graduation and more is made possible through the system.

C : Contents building system and Digital library Similar with the cases oversea, Multimedia Contents with the existing information is managed as part of the library collection. After the completion of the creation and distribution process of the lecture materials, they are stored in CD or the Multimedia Data for backup management in the library. The text of reading materials, which are used in

lectures, such as books related to the course and various theses papers, are also to be made possible as reference. The management on these Digital Contents are stored in PDF, TEXT, HTML, XML contexts and is utilized as materials for the lectures.

D. : GRUPWARE System In the case of Groupware System, it encompasses the capacity of groupware bringing efficiency the operation of E-Learning Education. It enables counseling and exchanges of information between professors and students at the E-Learning Education. Providing services on various information through the bulletin board system, operation on lectures open to public, letters and voice chatting systems on internet are all provided bringing closed group discussions between students and professors possible.

Groupware System provides E-Mail, BBS, Chatting, Personal Information Management, Schedule Management System.

IV. The Ways of Successfully Operating E-Learning Education.

A. Organization of Internet Lectures

First, the contents of the lecture should be able to be prepared based on HTML for the lecture on E-Learning Space, second,

it should provide a system which the lecture materials for the semester could be easily notified through Web Server. Third, the notified materials should be established in a way which lectures or requested form of lectures would be efficiently used for Distant Learning or Home Study.

Furthermore, exchanges between professors and students, registration for courses, enrollment, attendance record, academic records of the students, tests through internet and many other necessary operations for lectures should be fully equiped.

B. Organization of Lectures On Demand

When lectures are carried out in reality the deployment in the sense of satellite broadcasting, the service should be provided in the form of Learning station of local. However, in order for the lectures to be processed in both ways, organization of studio is a necessity for the lectures in reality. As a simple example, in the case of UTRA Education in U. S. A., operation of the studio, not only is supplied to the existing Learning station of local at 5 states and is carried out in the open education level but also distribution by the satellite is made possible. Both ways lectures are made possible even to the Local node overseas. Here, the contents of lectures should be exchangeable domestically and internationally.

D. The Organization of Textbook Production Lab

The Textbook production lab should be equipped with the necessities for the production of Multimedia textbooks and should enable the production of lectures. In addition, it should be prepared for services through internet or satellite by efficiently managing the already produced contents of the lectures and the tools for producing them. In line with this, for the professors who are not familiar with the internet, convenient HTML producing equipments and instruction tools for notifying on the Web Server should be provided.

V. Fundamental Technologies needed in the Realization E-Learning Education

The fundamental technologies needed in the realization of E-Learning Education has been equipped in the sense of complementing the demerits of Web CORBA based Middle ware. The Middle ware has been set up for Web based environment which enables ODBMS, IRS (Information Retrieval system), and VOD (Video On

Figure.2 . Fundamental Technologies of E-Learning Education
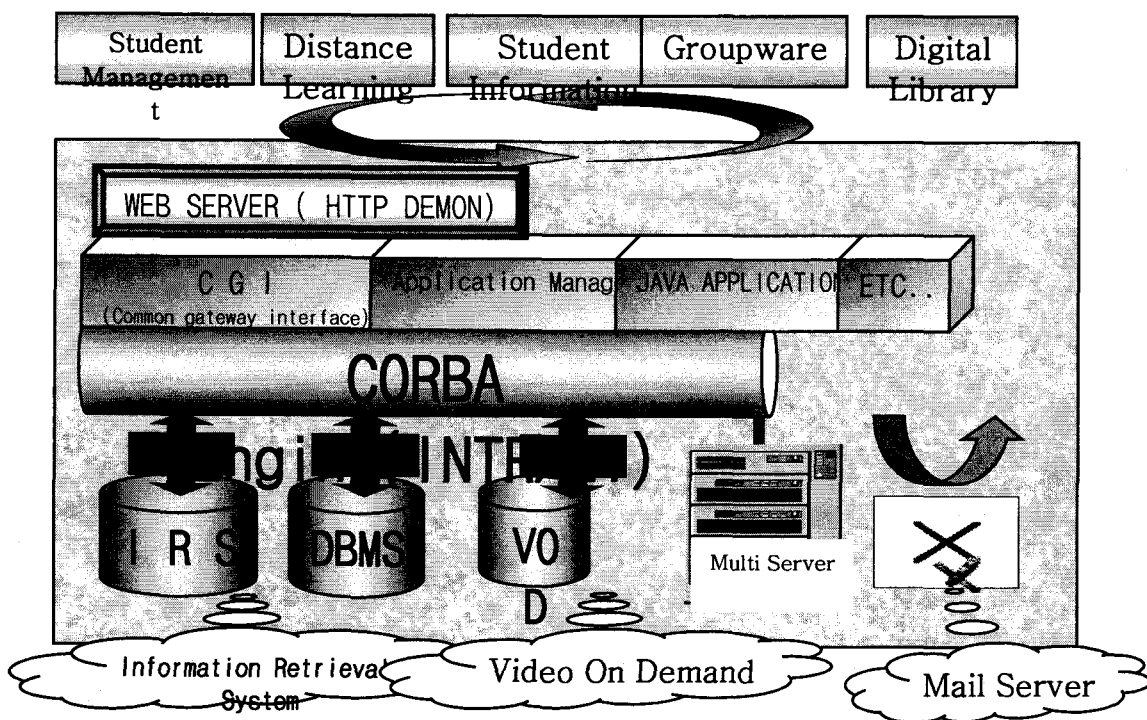
Demand) for managing the materials for the Multimedia lectures acquiring Multi-servers, Multi-users without the utilization of CGI (Common Gateway Interface) program.

The Software for the management of E-Learning Education consists of Distant Learning module for Distant Learning lectures and Home Study between the professor and student, Student Management module for enrollment, management on registration and graduation of the E-Learning Education students, module for providing the necessary information for the students, Student Servicing module for the exchanges of Multimedia information between professors and students, electronic library module for the reference provided of thesis papers and reading materials for courses, and finally, the Lectures On Demand module for Multimedia Lecture.

VI. Conclusion- E-Learning Education

Up to now, preparation of Solution for the management of E-Learning Education and its general plans aspect of operation has been mentioned. Still, up to present, the various legal and systematic arguments on the operation of E-Learning Education and the touch of humanity elements ignored between teachers and students in the class of E-Learning Education has been brought up by many universities and yet have not been completely solved.

Presently, among the many problems universities are worried in carrying out the Distant Lecture, one of them is the lack of humanity. Through Distant Lecture, teachers and students are exchanging merely knowledge and information no humane side of emothions could be exchanged. Another problem pointed out is the class of people which are left out in Distant Lecture. However, what has been witnessed in the materials based on case studies of Distant Lecture done for 1 year of 1997, e-Learning lectures have been able to induce the nonactive students to active participants in class; around 90% of class participation was achieved.

I strongly believe that the education in the 21C would be approached in the aspect of life-long, Open Education and beyond the barriers of nationality. At present, as national power is determined by economical strength. I can assure you that in modern national power would be destined by cultural, information and educational wars.

And to be prepared for these wars, it seems that wise judgements and readiness by the education and school organizations are needed and like the re-organizing movement in the economical structure, education system should also be free to undergo re-organization. In line with this, I believe that preparation for E-Learning

Education is the pride in continuing our own nation's administration of education culture and is for the coming globalization of Universities & companies.

References

1. Althauser R. Collabroative learning via study groups and the electronic classroom. Eds. By S. Hamilton & E. Hansen. Souce book for collaborative in the arts and sciences at Indiana Education. Pp.

2. Hiltz S. (1991). The virtual classroom: software for collaborative learning. Ed. By E.. Barrett. Socionmedia.

3. Schwartxz. H. (1992). Intellectual community via telecommunications. Eds. By Hamilton & E. Hanxen. Sourcebook for collaborative learning in the arts science at Indiana Education.

4. Slatin. J. m. (1991). In there a class in this text? Creating knowledge in the electronic classroom. Ed. BY E. Barret. Sociomedia.

5. Turoff, M (1995). Designing a virtual classroom. 1995 International Conference on Computer Assisted Instruction ICCAI' 95.

6. Perrin, Donald, "The Education of the Future," ED Journal,vol.9,No.2 (Feb.1995)

7. Wagner,Ellen D.& McCombs,Barbara L., "Learner Centered Psychological Principles in practice: Design for Distance Education, "Educational Technology, March–April 1995.

8. Clark, R. E. and Salomon, G., media in Teaching, In Wittrock, M. C., ed.,Handbook of Research on Teaching, Macmillan, New York, NY, 1986

9. Earnshaw, R. A., "Developments in Multimedia Technologies, Learning Environments, Distributed Access, and Interactive Perceptualization," Earnshaw,R. A. and Vince, J.A., ed., Multimedia Systems and Applications, Acedemic Press, London, 1995

10. Gayeski, Diane, M., "Getting Started in Multimedia : Avoiding Common Pitfalls," Gayeski, Diane, M. ed., Multimedia for learning : Development, Applications, Evaluation, Educational Technology Publications, Englewood Cliffs,NJ, 1992

11. Glaser, r., "Education and Thinking : The Role of Knowledge," American Psychologist,Vol. 39, 1984

12. Hammer, Michael and Champy, James, Reengineering the Corporation, Harper Business, 1993

13. Hiltz, Starr Roxanne, The Virtual Classroom : Learning Without Limits via Computer Networks, Ablex Publishing Corp., Norwood, NJ, 1994