

Study of e-learning and ICT Education in Korea

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ABSTRACT

In this paper, we described ICT (Information and communication technologies) and e-learning in education of Korea. We conducted a case study of teaching education based on blended learning and collaborative education for Home Economics Education of Masuk middle school in Korea. And we suggested the feasible design of the e-classroom and e-school. We can see that three of fourths of the students satisfied with ICT-based education from our survey.

Keywords: ICT, e-learning, blended learning, e-school, Internet

1. INTRODUCTION

“The illiterate of the 21st century,” according to futurist Alvin Toffler,” will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn. Globalization and technological change in the 21st century have created a new global economy powered by technology, fueled by information and driven by knowledge [1]. Information and communication technologies (ICTs) have been touted as potentially powerful enabling tools for educational change and reform. When used appropriately, different ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by, among others, helping make teaching and learning into an engaging, active process connected to real life [2]. In the information age, teachers have realized that they need to be knowledgeable, skillful and able in applying ICT effectively and efficiently.

The Korean government was implementing policies to enhance ICT education which includes curriculum, school administration, and personnel management under the “Seventh National Curriculum” in December, 1997, to foster autonomous and creative citizens that will lead the age of globalization and informatization in the 21st century. “Adapting ICT into Education” project was launched after “The First Education Reform Plan” announced in May, 1995. “Adapting ICT into Education”

project was a comprehensive and systematic approach designed to achieve more flexible, productive, and efficient education by diversifying and improving educational contents and method, and to induce and promote a change in thinking and behavior in the information-based society. This project has been continuously developed for more than 30 years as a tool for education reform and can be classified to four stages by period and development status. And this project assists about ten million students in 11,000 primary and secondary schools and 200 higher educational institutes. The details of “Adapting ICT into Education” project are described in the following section. In this paper we study ICT and e-learning in education of Korea and education model with blended-learning scheme, and collaborative education. We also suggest the feasible design of the e-school as a way of teaching education and the ICT-based curricula for Home Economics Education of middle school. To evaluate the degree of satisfaction of students taking ICT-based education, a survey was conducted. Following this introduction, we describe ICT and e-learning in section 2. In section 3, a case study of teaching education in e-school is described. Finally, conclusions are presented in section 4.

2. ICT AND E-LEARNING

The capacity for ICT has been growing exponentially over the last 10 to 15 years. Computers have become more powerful, satellite, fiber optic cable and wireless technology has increased transmission capacity; and software developments have made it easier to create digital materials such as electronic games, computer simulations and educational materials. Also, there has been a vogue for e-learning in most disciplines of higher education. The ubiquitous presence of Internet, rapid advancement in ICT and recent developments in learning technology have resulted in transition of traditional technology supported distance education from e-learning to mobile learning.. The traditional context of learning is experiencing a radical change. The concept of traditional education does not fit well with the new world of lifelong learning, in which the roles of instructor, students, and

curriculum are changing. Learning methods need to become more portable and flexible. E-learning has been crucial to meet this new challenge. E-learning refers to any type of learning situation when instructional content is delivered electronically via the Internet when and where people need. Broadly speaking "if someone is learning in a way that uses ICTs, they are using e-learning [3]. The concept of e-learning has emerged from distance learning and offers new methods for distance education based on ICTs. E-learning is the modern form of distance education supported and driven by ICT and is characterized by any place and anytime learning. To make use of full potential of this form of learning, it is necessary for both learners as well as instructors to be well aware with the related existing technologies. E-learning is meant for learner communities, which may vary significantly in terms of accessibility, hardware and technical proficiency. Hence, instructors must design the courses keeping in mind the learners' technical limitations so that they may use e-learning tools effectively [4].

2.1 Adapting ICT into Education

"Adapting ICT into Education" project in Korea are classified as four stages; Beginning Stage, Rolling-out Stage, Evolving Stage and Expansion Stage. In the Beginning Stage started from 1970 to 1985, computing education began in vocational high schools and in lifelong education by use of UHF (ultra high frequency) TV and FM radio channel. In the second stage (Rolling-out Stage) started from 1986 to 1995, the "Act on the Expansion and Promotion of the Use of Computer Network" was announced to construct the national backbone networks. And the Ministry of Education (MOE) established the "School Computer Education Master Plan" in December 1987. This plan aimed to enhance the level of computer education and to generalize its utilization in schools. As personal computers have been widely distributed, the computing education has been systemized as a common education to adapt to knowledge and information-based society. The computer literacy training was implemented to enhance quality of education in this period. In the next breath, the "Network Arbitration Committee" selected computer education in school as the top priority project boosted by the government-wide project by Fifth Network Arbitration Committee in December 1988. In addition, as the "School Computer Education Promotion Master Plan" was established in July 1989, computer education has been more expedited across the nation beyond the MOE level. This plan focused on substantial actions such as supply of computer hardware and software and educational, administrative and financial assistance to computer teachers. The "Sixth National Curriculum" announced in 1992 allows computer learning and word-processing courses to bring into "Practical Subject" for

fifth and sixth grade in elementary school and it became possible to conduct computer education at the discretion of each school. In middle school, computer chapter was included in Technology and Industry subject. During the third stage (Evolving Stage) from 1996 to 2000, systematic plan, laws and regulations required for the project "Adapting ICT in education" were prepared and communication infrastructure for education informatization was constructed.

After the "Seventh National Curriculum" was announced in December 1997, computer course has been included in "Practical Subject" of fifth and sixth grade in elementary school. It is also selected as an optional subject of extra curriculum in middle school. Teaching and learning in cyber space has been enabled with the opening of Cyber Learning Service in October 1998, which is an educational content service, by EDUNET. EDUNET provided customized education services to individuals through cyber texts, and it contributed to diversification and upgrading of education in elementary and secondary schools. Integrated School and Information Management System (SIMS) has been developed and distributed to all schools, which greatly reduced many burdensome jobs in school administration.

In the final stage (Expansion Stage) from 2001 to 2005, highest level of communication infrastructure was procured in Korea. Fiber to the Home (FTTH) enables mega-speed Internet connection and number of Internet users rapidly increased to reach more than 10 million. With the completion of education informatization in elementary and secondary schools nationwide, Korea became one of the most advanced countries in the world in the field of infra-structure of education informatization. The "Adapting ICT into Education Master Plan II" in May 2001 and the "ICT based School Education Promotion Plan" in March 2001 were established to develop human resources and achieve education reform under the "Cyber Korea 21" project, which had been carried out by the new administration. EBS broadcasting service started to provide video on demand (VOD) and Internet lectures for primary and secondary school students [5].

2.2. Blended learning

The first generation of e-learning programs focused on presenting physical classroom-based instructional content over the Internet. The experience gained from the first generation of e-learning, often riddled with long sequences of 'page-tuner' content and point-and-click quizzes, is giving rise to the realization that a single mode of instructional delivery may not provide sufficient choices, engagement, social contact, relevance, and context needed to facilitate successful learning and performance. In the second wave of e-learning, increasing

numbers of learning designers are experimenting with blended learning models that combine various delivery modes [6]. The widely accepted definition of blended learning is a combination of face to face and computer based teaching. A more extensive definition that highlights the importance of practice and theory in underpinning is given by Heinze [7]. To make blended learning more powerful, you can start looking at all the media as options: classroom training, Web-based training, webinars, CD-ROM courses, video, EPSS (electronic performance support systems) and simulations. Other media such as books, job aids, conference calls, documents and Power Point slides can be considered as tools. Early computer-based training programs were represented by instructional design that focused on independent study. Partnered with the evolution of Internet technologies, computer-based programs started to use more collaborative interaction, including the experiences and feedback of other participants in various asynchronous (self-directed) and synchronous (live and online) exercises. Three levels of collaboration, cooperation, coordination, and true collaboration are shown in [8]. In Korea, blended learning is prevalent delivery method in middle and high school, however, the use of blended learning was still modest for most of teachers and students [9].

3. CASE STUDY OF TEACHING EDUCATION IN E-SCHOOL

The success of learners in any learning environment is largely dependent on their personal motivation. The motivation of learners in non-traditional programs seems to be fundamentally based on personal convenience and lifestyle. We carried out a blended learning education which combines offline in a traditional classroom setting and online forms of learning over the Internet or Intranet. We propose a model of teaching education based on blended learning and collaborative education for Home Economics Education of middle school (see Table 1). We assume that even the offline learning offerings are managed through an online learning system. In this case study, we conducted the blending of self-paced and collaborative learning which may include review of important literature on a regulatory change or new research and peer-to-peer discussion of the materials. Self-paced learning implied solitary, on-demand learning at a pace that is managed or controlled by the learner. An example of this type of blending includes a learning program that provides study materials and research resources over the Web, while instructor provides classroom training sessions as the main medium of instruction. Typical example of E-learning system of Masuk middle school in Kyungki-do, Korea, is shown in

Fig. 1. Media producing system consists of e-classroom, digital studio and editing system. E-learning operation system consists of web server, DB (data base) server, VOD (video on demand) server, real-time server and soft wares. Typical e-classroom in e-school is also shown in Fig. 2. Producer consists of electronic copyboard, instructor PC (personal computer), beam projector, wireless mike, student camera and instructor camera. Encoder in media producing room consists of encoding PC (Encoder) and A/V (audio/ video) controller. TCP/IP (transmission control protocol/internet protocol) is being used between instructor PC and encoder. Wired Internet service is provided by FTTH (fiber to the home) at the speed of 100Mbps and wireless Internet service is provided by Wi-Fi (wireless fidelity) up to 512Kbps speed. Typical E-school system of Masuk middle school is shown in Fig. 3. The student to computer ratio (SCR) is 3.0 and teacher per PC is 1.0 in Masuk e-school, and well functioning wireless network, wibro, is established. This e-school makes it possible to share peripheral devices such as printers, plotters, scanners, and hard disk storage space and related curriculum materials in DB. In each e-classroom, one projection TV (43 inches), one beam projector, one VTR, 30 desktop computers for students, one teacher's workstation, two laser printers and one electronic copyboard are connected via the LAN to the EDUNET which is a comprehensive educational information service system provided by KERIS (Korea Education and Research Information Service). Real-time education on site is possible and the materials captured by digital camera and PDA can be transmitted to the instructor and can be stored in DB via communication link. To evaluate the degree of satisfaction of students taking ICT-based education, a survey was conducted with sample questions after delivering a course in Table 1. The participants of this survey were 74 students at Masuk middle school and the result is shown in Fig.4. From this result, we can see that 75% of students (55 students) satisfied with ICT-based education and 11% of students (9 students) did not satisfy with ICT-based education.

4. CONCLUSIONS

The 'Education Reform Proposals for the Establishment of a New Education System' focuses on 'Information', 'Globalization' and 'Localization' of the Korean Education system. To achieve a sophisticated knowledge-based society, it is essential to foster creative thinking among students and to create an educational information infrastructure and a cyber education system. In this paper we described ICT and e-learning in education of Korea. The use of ICT in secondary schools

Table 1. Model of teaching education based on blended learning and collaborative education for Home Economics

Unit (Subject)	sex education for youth-pregnancy & childbirth		Lecture hours (periods)	3 (2 weeks)	
Learning Objectives	1. education for youth's physical, physiological & emotional development 2. comprehensive sex education: abstinence as a positive choice, contraception & avoidance of STIs 3. Discussion about premarital sex & sexual ethics				
Type of class	blended learning & collaborative online exercise				
Materials	textbook, audio/video, multimedia, computer, Internet				
Stage	teaching learning activity		learning method		
	teacher	student	blended learning	collaborative learning	ICT based learning
Problem raise	<ul style="list-style-type: none"> ▸ raises questions ▸ guide for youths' sex ▸ student objectives ▸ team organization 	<ul style="list-style-type: none"> ▸ objectives understanding ▸ explore pregnancy & childbirth ▸ learner's role understanding 	<ul style="list-style-type: none"> ▸ face to face class ▸ instructional Procedures 	<ul style="list-style-type: none"> ▸ generates curiosity ▸ peer understanding 	<ul style="list-style-type: none"> ▸ education for youth's physical, physiological & emotional development
Exploration activity	<ul style="list-style-type: none"> ▸ derive definitions of sex ▸ explanation of exploration activity 	<ul style="list-style-type: none"> ▸ exploration method ▸ exploration schedule ▸ team mission 	<ul style="list-style-type: none"> ▸ role assignment 	<ul style="list-style-type: none"> ▸ ice breaking ▸ communication skills 	<ul style="list-style-type: none"> ▸ DVD ▸ Internet site ▸ power point
Investigation	<ul style="list-style-type: none"> ▸ activity assistance as a facilitator 	<ul style="list-style-type: none"> ▸ role assignment ▸ physical development ▸ sexual purity ▸ pregnancy 	<ul style="list-style-type: none"> ▸ physiological & emotional development 	<ul style="list-style-type: none"> ▸ debate: sexual purity ▸ listen critically to others' explanations 	<ul style="list-style-type: none"> ▸ Internet surfing method
Application	<ul style="list-style-type: none"> ▸ problem solving ▸ how to apply ▸ how to make a report 	<ul style="list-style-type: none"> ▸ web based discuss ▸ possible solutions ▸ writing reports 	<ul style="list-style-type: none"> ▸ abstinence as a positive choice, contraception & avoidance of STIs 	<ul style="list-style-type: none"> ▸ Makes connections of topic to real world situations. 	<ul style="list-style-type: none"> ▸ Discuss on the Web
Self-directed learning	<ul style="list-style-type: none"> ▸ Answers open-ended questions 	<ul style="list-style-type: none"> ▸ review wrap up 	<ul style="list-style-type: none"> ▸ presentation 	<ul style="list-style-type: none"> ▸ assess group-process skills. 	<ul style="list-style-type: none"> ▸ Documentation
Evaluation	<ul style="list-style-type: none"> ▸ assessment 	<ul style="list-style-type: none"> ▸ expand understanding of topics. 	<ul style="list-style-type: none"> ▸ feedback results 	<ul style="list-style-type: none"> ▸ share results 	<ul style="list-style-type: none"> ▸ wrap up

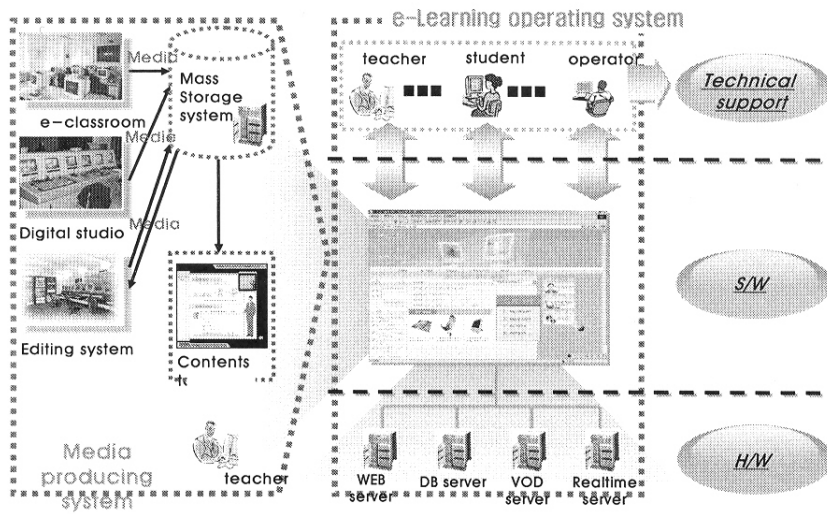


Fig.1 E-learning system of Masuk middle school

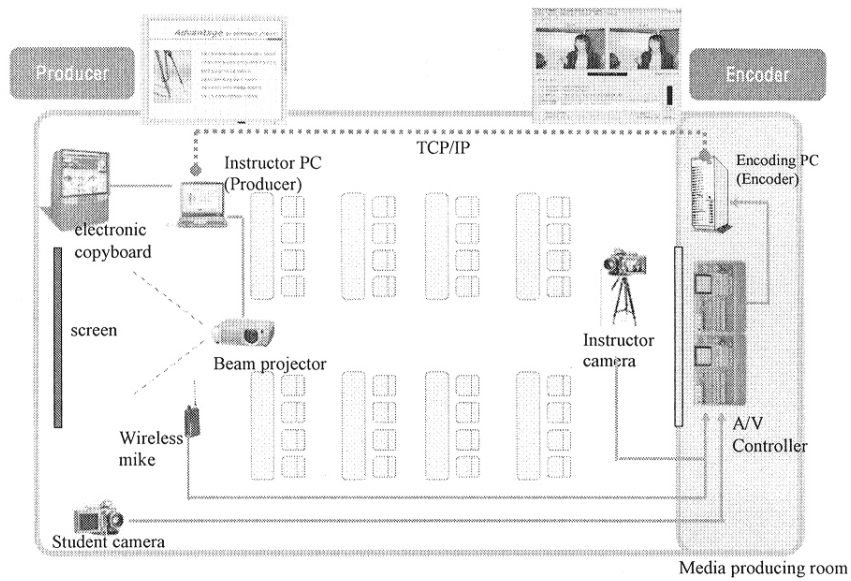


Fig.2 Typical E-classroom in E-learning system

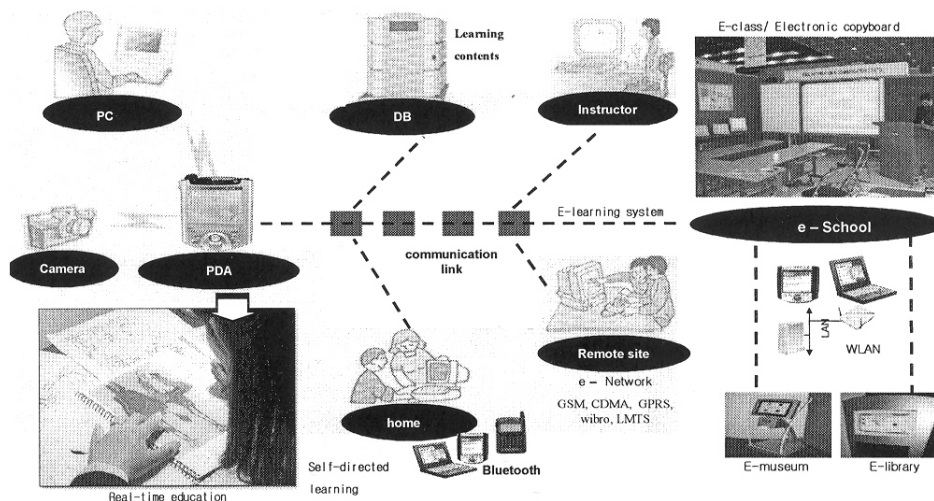


Fig. 3 Typical e-school system of Masuk middle school

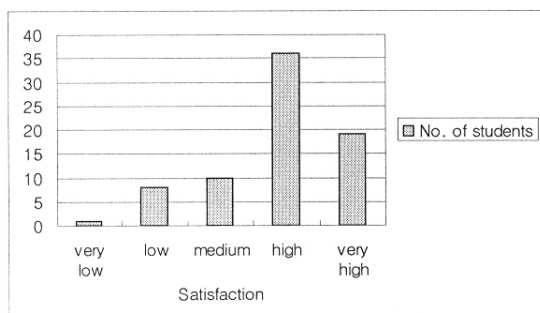


Fig.4 Satisfaction degree of ICT-based education

was carried out according to “Adapting ICT into Education Master Plan” and “ICT based School Education Promotion Plan II”. We studied a model of teaching education based on blended learning and collaborative education for Home Economics Education of Masuk middle school in Kyungki-do. And we suggested the feasible design of the e-classroom and the e-school. The characteristics of an online learning environment have a great impact on student satisfaction [9]. We can see that three of fourths of the students satisfied with ICT-based education from our survey. Future research may include obtaining feedbacks of the students about the online and the blended learning environment.

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