Some Considerations in Diffusing E-teaching for Higher Education: A Case of Sahmyook University in Korea

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Abstract

Over the past few years, many higher educational institutions have begun to implement e-learning technologies, initially by blending them with conventional classroom activities. For an educational change like this to be truly reformative, as the educational authorities wish, universities/colleges will need to effectively manage this transition, as well as provide technical support to all relevant parties.

The purpose of this study was to determine the underlying factors that keep higher educators away from e-teaching, and to discuss strategic issues associated with the diffusion of e-teaching in the context of higher education. One case of a smaller University in Korea was closely analyzed for this purpose. This study focused on the provider's side of e-learning as the delivery of course contents via electronic media, especially the Internet.

Keywords: **e-campus; e-learning; e-teaching; technology acceptance**

INTRODUCTION

Education is a vital factor for economic development in that it is a source of quality labor – this is particularly true in countries like Korea, which are poorly endowed with natural resources. Most Korean parents perceive good education to be the sole avenue to a successful life, and are thus willing to sacrifice much to support their children's education. As such, "educational fever" has become the source of many societal problems. Competition for higher level schools is cut-throat and the path one must traverse to gain admission into a prestigious University in Korea is often referred to as "education hell."
With the practice of private tutoring becoming virtually universal as a consequence, the cost of education has become a profound economic burden for many, and this is particularly salient for less-than-well-to-do families. Furthermore, the gap among households across various income levels has widened due to the sluggish economy in recent years. This has triggered an "educational polarization" phenomenon in Korea.

In an effort to close this gap while utilizing advanced IT innovations, a series of measures have been implemented to discourage private tutoring. Government implemented the e-learning initiative as a component of its educational reform strategies, initially laying the technical infrastructure in the late 90's for all classrooms to have access to a variety of digital media. A series of educational breakthroughs have been achieved.

Although the e-learning initiative has gained momentum in the majority of grade schools, it yet to gain significant ground in higher education. Over the past few years, many higher educational institutions have begun to implement e-learning technologies, initially by blending them with conventional classroom activities. For an educational change like this to be truly reformative, as the educational authorities wish, universities/colleges will need to effectively manage this transition, as well as provide technical support to all relevant parties.

From personal observations as an e-learning planner at Sahmyook University, higher educators may have some good reasons for either adopting or avoiding this new educational trend. For instance, one theology professor interviewed asserted that direct effective communication was so vital to his pedagogy that any means other than eye-to-eye contact might prove unacceptable.

The principal objective of this study was to determine the underlying factors that keep higher educators away from e-teaching, and to discuss strategic issues associated with the diffusion of e-teaching in the context of higher education. One case of a smaller University in Korea was closely analyzed for this purpose. This study focused on the provider's side of e-learning. In other words, e-teaching here was defined as delivery of course contents via electronic media, especially the Internet.

A CASE

Sahmyook University, located in the vicinity of a metropolitan area, is a mid-sized 4-year university with over 5,500 enrollments in 6 colleges and 4 graduate schools. It has recently celebrated its centennial, and has grown gradually from a Christian mission school to a University housing 22 departments, including literature & humanities, natural sciences, and arts and PE.

A. E-campus drive

In the wake of the national informatization drive that began in the early 90's, different levels of grade schools developed an IT network that connected every classroom. The first phase of the drive, as such, was targeted toward a resolution of the proliferation of private tutelage and its associated societal problems. Higher education, however, remained rather inactive in terms of this sort of educational reform. Eventually, competition among higher education entities ignited as the result of a decrease in the youth population, and since the beginning of the 21st century, these institutions of higher learning have experienced pressure to improve their educational services. Computers and the high-speed Internet, among other factors, have ushered in radical changes in University administration and academic services. Universities have adopted a variety of effective teaching and learning methods and have encouraged exchanges of credits earned through both on- and off-line learning. The majority of universities, unlike cyber universities, provide e-learning contents to complement the off-line classes. According to the E-learning White Paper, over 80 percent of all universities and colleges have adopted e-learning in various formats as of the end of 2007(http://www.moe.go.kr).

Sahmyook University could not set itself free from this nationwide trend. In 1997, the University rented a dedicated T1 line, the fastest backbone then available, to construct a campus network for the first time. However, it was not until several years had passed before this novelty began to facilitate meaningful applications in addition to e-mailing and web-presentation applications. In 2000, web-based applications were developed for student services such as registration via the Internet, and intranet applications. Soon afterward, wireless Internet and WiFi hotspots throughout the campus eventuated about another round of innovations in higher education. The entire campus is now generally wire- and wirelessly networked– notebooks and PDAs can access the Internet both inside and outside of classrooms and offices.

The E-learning Support Team (ELS) of Academic Affairs is in charge of a variety of e-learning support activities for both students and instructors, and also a set of designated e-learning media servers. The ELS is comprised of a team leader and his several assistants. In fact, e-learning support in Sahmyook University has been nominally functioning, while major universities have begun to beef up their facilities and human

resources in order to take advantage of these new opportunities.

Figure 1 depicts the e-learning architecture of Sahmyook University. Media servers host e-learning contents, and an LMS server controls all sorts of teaching and learning processes. An instructor has his/her classroom lectures videotaped by ELS staff, or higher quality video streams can be taken at a studio on campus. Quick-and-dirty streaming files may well be compiled by the lecturers themselves using encoding software in front of PCs. The ELS staff edits these files prior to uploading them on a media server.
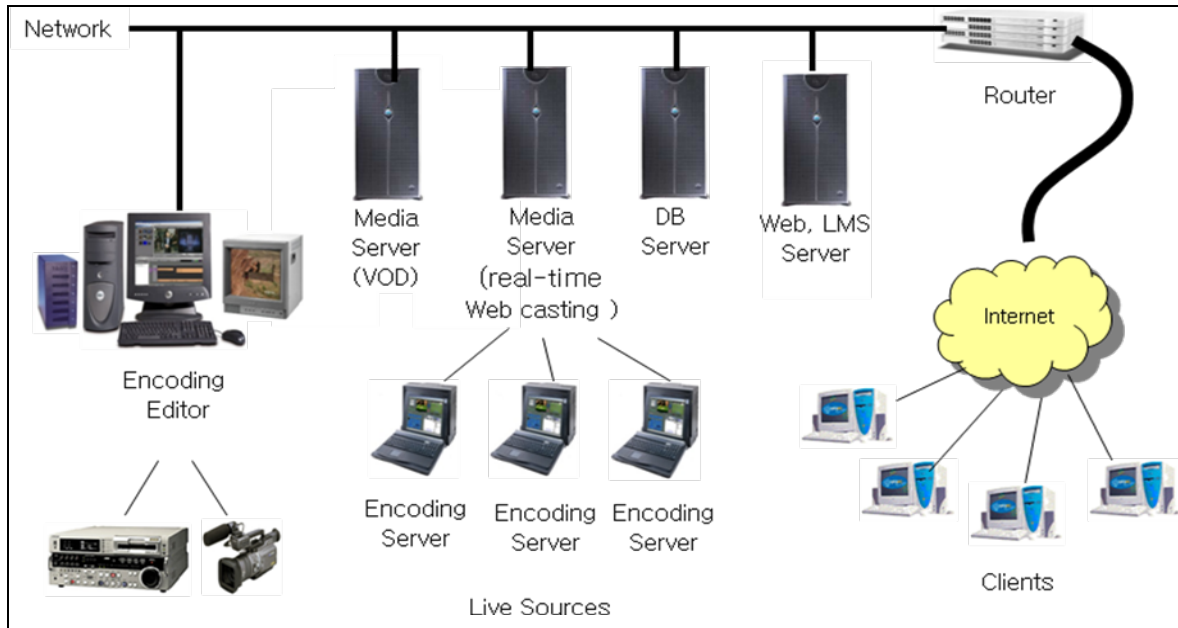

Figure 1. E-learning System Architecture of Sahmyook University

B. E-teaching

E-teaching at Sahmyook University had remained inert and ineffective until an e-campus plan was initiated in 2005, in an effort to promote web-based teaching and learning. This awareness campaign was enforced by a timely government grant worth 2 million dollars over five years for healthcare research and welfare-related education. Some participants of this project began to compile video presentations, thus playing a role of an early adopter of e-teaching. At the same time, the University began paying a fixed-amount incentive to a selected e-learning course. Also, a user-friendly encoding software tool was made available to whoever wanted to mimic classroom teaching through the Internet.

As is shown in Table 1, the number of new courses offered through ELS media servers has grown year after year. The majority of these were funded either by Government grants (for healthcare and welfare-related subjects), or in part by University funds. E-teaching courses included lectures on nursing, physical therapy, pharmacy, social welfare, nutrition, education and general subjects. As of Fall 2007, 40 courses were provided on the Internet - only three percent of all courses offered during the semester. The majority of these courses were for the purpose of blended e-learning and/or the

provision of references. Sheer cyber lectures through the Internet, with few meetings in classroom meetings, were conducted in only three courses. In addition to the above 40 e-learning courses, ELS operates two cyber courses – a basic computer skills course, and a TOEIC self-test program.

Table 1. Development of E-Teaching Courses

Year Semester	Subject Areas	Number of Subjects
2005 Spring	Nursing	5
	Computer	5
Fall	Nursing	3
	Pharmacy	2
	Social Welfare	2
	Health	1
	Natural Science	3
	Education	2
	Business	2
2006 Spring	Nursing	2
	Computer	1
	Education	2
	Physical	2
	Therapy	1
	Theology	
Fall	Nursing	5
	Physical	4
	Therapy	4
	Natural Science	2
	Education	
2007 Spring	Nursing	3
	Physical	1
	Therapy	2
	Education	1
	Natural Science	2
	Theology	
Fall	Nursing	1
	Physical	1
	Therapy	3
	Theology	1
	IT	

C. Perceived problems

Most of the lecturers at Sahmyook University appeared to have been unconvinced of the new technologies – less than ten percent of all lecturers of the University were practicing any form of e-teaching as of Spring 2007. In order to allow for a successful e-campus drive to kick-off, questions as to the underlying forces against the drive ought to be answered before we can work on promotional strategies. Questions include:

(1) Does this slowcoach have something to do with the personal demographic characteristics of the lecturers? Do aged male professors exhibit slower adaptation to inventions, as has often been suggested by socio-biologists? By the same token, do young female lecturers evidence an inclination to promptly adopt new things? If so, this would certainly explain the adoption lifecycle of disruptive technology, which has been well explored by Everett Rogers and others.

(2) What is the significance of a professor's attitude toward and belief in the effectiveness of e-teaching? Positive perceptions of the effectiveness of the new teaching methods would be expected to bolster willingness to try them.

(3) Does the general belief in different pedagogical means applicable to different study fields have any effect in this case? Apparently, no e-teaching courses have yet been attempted in fields such as fine art and music. In some cases, interactions between a lecturer and his/her students are too vital to the process for distance learning to be effectively employed. Talking with several theology professors has shown that their courses required effective non-verbal or emotional communications, which they believed, could hardly be practiced in the e-teaching environment.

(4) Will computer competency stimulate e-teaching? Will those competent with computers opt for the benefits of delivering lectures in a digital format?

(5) Some may be less motivated simply because they were not instructed to adopt new methods. It is also possible that the currently existing economic incentive structure of the University was not compelling to professors.

There may be other hidden factors that explain the slow adoption of e-teaching at this particular campus.

ANALYSIS AND RESULTS

With the above questions in mind, a survey was conducted among the lecturers at Sahmyook University. As mentioned above, the principal objective of this survey was to determine out the underlying factors that hinder the adoption of e-teaching against the wishes of the University. It was hoped that the survey results might contribute, in one way or another, to the establishment of an effective e-learning diffusion plan.

A sample of 77 returned the questionnaire prepared specially for the survey. Table 2 shows the basic sample distribution. Statistical analyses of respective questions yielded the following results:

Table 2. Sample Distribution

Category		Frequency	Percent
Gender	Male	60	77.9
	Female	17	22.1
Major	Humanities	35	45.5
	Natural Science	29	37.7
	Art & PE	7	9.0
	Nursing	6	7.8
Age	Under 40 years old	12	15.6
	40- 49	27	35.1

	Over 50	38	49.4
Years of Teaching	Less than 5 years	11	14.3
	5-9	19	24.7
	10-14	16	20.8
	15-19	12	15.6
	Over 20	19	24.6
Total		77	100.0

A. Perceived E-teaching Effectiveness

It was assumed that the perceived effectiveness of e-teaching would differ across different study areas. Furthermore, it was also assumed that a deeper understanding of e-teaching would result in an easier adaptation to it. In other words, individual professors might have different levels of expectation regarding e-teaching, depending on the category of studies – literature and humanities, natural sciences, and arts & PE. The perceived effectiveness of e-teaching was assessed at three levels – overall effectiveness (OVERALL), effectiveness in the replier's study field (AREAEFF), and relative effectiveness in comparison with classroom lectures (RELATIVE).

An ANOVA test rejected the above-mentioned hypothesis that different study groups should show different levels of perceived effectiveness of e-teaching (See Table 3). In other words, an instructor's major would have minimal significance with regard to his/her ratings on how much e-learning would be effective in general, in his/her respective study area, and in comparison with classroom lectures.

When asked openly about the pros and cons of e-teaching, most of the answers were consistent with the general understanding. Answers on the advantages of e-teaching included flexibility, repeatability, increased opportunities, and up-to-date contents. It was shown that many problems including the difficulty of self-education, difficulty of evaluation, insufficient interactions, unsatisfactory emotional exchanges, ineffective communication, and costly digital materials would hinder the e-teaching.

Table 3. ANOVA on Perceived Effectiveness of E-Teaching among Three Groups of Studies[a]

	Sum of Squares	Degree of Freedom	Mean Square	F-value	Sig.
OVERALL					
Between Groups	3.247	3	1.082	1.533	.214
Within Groups	49.415	70	.706		
Total	52.662	73			
AREAEFF					
Between Groups	2.420	3	.807	.825	.485
Within Groups	68.458	70	.978		
Total	70.878	73			
RELATIVE					
Between Groups	3.644	3	1.215	1.532	.214
Within Groups	54.685	69	.793		
Total	58.329	72			

[a] Three groups of studies are literature & humanities, natural science, and art & PE.

B. Majors and E-teaching

Next, the relationship between instructors' majors and the number of e-teaching courses was analyzed. As shown in Tables 4 and 5, the number of current e-teaching courses was correlated significantly with study areas – all majors used e-learning less than did the nursing department, for which department e-teaching was proposed as a component of a government funding project. All nursing faculty members sampled noted that they were using e-teaching protocols for more than one course.

Table 4. Crosstabulation of Majors and Number of E-teaching Courses[a]

(Percent in total)

Major	Number of Current E-teaching Courses				Total
	None	1 Course	More than 2	All Courses	
Humanities	35.1(27)	5.2(4)	5.2(4)	.0(0)	45.5(35)
Natural Science	26.0(20)	3.9(3)	5.2(4)	2.6(2)	37.7(29)
Art & PE	6.5(5)	.0(0)	2.6(2)	.0(0)	9.1(7)
Nursing	.0(0)	3.9(3)	2.6(2)	1.3(1)	7.8(6)
Total	67.5(52)	13.0(10)	15.6(12)	3.9(3)	100.0(77)

[a] counts in parenthesis.

Table 5. Chi-Square Test

	Value	Degree of Freedom	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.251	9	.023[**]
N of valid cases			77

** Significant at the .05 level

C. Computer Competency

Computer competency (COMABILITY) was measured as an average of self-reported ratings in areas including word processing, presentation, Internet application, and programming. The more competent one was with a computer, it was hypothesized, the more likely one would be to utilize digital devices in one's instruction.

Correlations between computer competency levels with other variables concerning e-teaching practices are shown in Table 6. The correlation analysis demonstrated that computer literacy had positive significance with current e-teaching practices (ELNOW). At the same time, the number of current e-teaching courses (ELNOW) would, in turn, influence use of e-teaching in the future (ELPLAN) (alpha=.01). In other words, the existing e-teaching courses would repeat in the coming semesters with some necessary modifications made to the existing materials.

Furthermore, the number of current e-teaching courses (ELNOW) was correlated significantly with the perceived effectiveness of e-teaching in one's teaching areas (AREAEFF) and that in comparison with classroom teachings (RELATIVE). These positive correlations suggested that current e-teachers were perceiving e-teaching as being more effective in his/her instruction than conventional classroom teachings, and would continue to use it.

Table 6. Correlations between Computer Competency and E-teaching Practice

	COMABILITY	ELNOW	ELPLAN	AREAEFF	RELATIVE
			(Pearson Correlation Coefficients)		
COMABILITY	1	.200*	.087	.063	.043
ELNOW		1	.569***	.272**	.322***
ELPLAN			1	.315***	.203
AREAEFF				1	.748***
RELATIVE					1

*** Correlation is significant at the .01 level
  ** Correlation is significant at the .05 level.
   * Correlation is significant at the .10 level.

D. Gender Differences

Does one's gender significantly affect his speed of adoption of e-teaching? Apparently, female professors at Sahmyook University appeared to be more ready to adopt new technology. Our survey showed that female professors were currently e-teaching (ELNOW) 2.18 courses on average, whereas their counterparts were e-teaching an average of 1.38 courses (See Table 7). E-teaching plan in the future (ELPLAN) was also different by gender, with female professors planning it more immediately. ELNOW and ELPLAN differed significantly by gender (See Table 8).

Table 7. Gender Group Statistics

Gender		N	Mean	Std. Deviation
ELNOW	Male	60	1.383	.7612
	Female	17	2.176	1.074
ELPLAN	Male	60	2.767	1.711
	Female	17	3.688	1.702

Table 8. Independent Samples Test

		t-test for Equality of Means			
		T	Degree of Freedom	Significance	Mean difference
ELNOW	Equal variance assumed	-3.445	75	.001***	-.7931
	Equal variance not assumed	-2.848	20.760	.010***	-.7931
ELPLAN	Equal variance assumed	-1.915	74	.059*	-.9208
	Equal variance not assumed	-1.921	23.740	.067*	-.9208

*** Significant at .01 level
  * Significant at .10 level

E. E-Teaching Support

Open-ended responses regarding what sort of supportive measures would be helpful to diffuse e-teaching included advertising, provision of friendlier solutions, need for a

designated studio, and individualized training for e-teaching skills. Along with technical support, some suggested increased financial incentives. Among them, it was also suggested that e-teaching become a part of the University's development strategies.

DISCUSSION AND CONCLUSION

The major findings of our survey were summarized as follows: (a) No significant differences were found among faculty members of different groups of studies insofar as the perceived effectiveness of e-teaching is concerned. The level of understanding of e-teaching was self-reported to be approximately the average. (b) The number of current e-teaching courses showed significant differences among the study fields of the surveyed. Among them were cases in which e-teaching was required for and funded by a government project. (c) Strong computer competency of an individual could result in an increased propensity to use e-teaching. (d) Once e-teaching was attempted, individuals tended to continue using e-teaching in the following years, thereby implying that the e-teachers were highly satisfied with the new instructional avenue. (e) Female professors opted to e-teach more courses than did their male counterparts at the time of the survey. *Diffusion of Innovations*, a seminal work by Rogers (2003), demonstrates that the process of adoption of a new innovation will evidence a normal distribution, according to the demographic and psychological characteristics of the defined adopter groups. Additionally, this process involves a five-stage life cycle, from innovators, to early adopters, early majority, late majority, and finally the laggards (Mahony and Wozniak, 2006). At the time of the survey, we judge Sahmyook University to be in its early adoption stage, with less than 10 percent of faculty members having attempted a certain form of e-teaching via the university's media servers. Additionally, digitized teaching contents were only minimally available, mostly as a component of a government project. Whether the leading e-teachers were technology-enthusiastic and the rest were pragmatic according to above-said theory, the survey did not make clear, but computer competency was definitely significant in terms of the adoption of new instruction technology. Also, relatively more female professors were shown to be practicing e-teaching. In sum, it appears that in our examination, the leading group of e-teaching adopters, referred to as innovators, were largely female professors who were computer proficient, as well as those who had been instructed to adopt e-teaching (e.g., as part of a project).

On the other hand, the slowcoach, against the University's wish, shows the university being stuck to some degree in the schism described by Moore (1999) as almost inevitably forming between early adopters and the early majority, the first two stages of the diffusion life cycle studied by Rogers. According to Moore, such chasms develop because visionaries (early adopters) and pragmatists (early majority) have very different expectations from such disruptive innovations. Moore proposed some techniques of sophisticated marketing strategies that could be used to successfully bridge this chasm.

Moore's cross-chasm strategies shed some light on our case; Sahmyook University needs to launch a full-blown promotion drive as a major component of its comprehensive diffusion plan to the majority of the university faculty. Considering the faculty's favorable understanding of, and expectations from the new instruction tool, as well as the enabling technical support, we adjudge that what is most needed is simply to 'light the fire' necessary to cause the majority to leap the chasm. As Anderson et al. (1998) pointed out, comprehensive adoption strategies "cannot be based on support of early adopters, but

must be designed to appeal to the mainstream faculty." Most importantly, they must articulate the strategic value of e-learning as an educational reform.

Previous studies have revealed the importance of attitudes about e-learning. For instance, Baker et al. (2003) concluded, "faculty and student attitudes turn out to be key factors in the overall success or failure of institutional e-learning initiatives, and training and support are the strongest influences on those attitudes." As a computer-based system, new e-learning implementation should be properly managed at all times, because the new system will have a profound behavioral and organizational impact. Otherwise, the internal organizational change will frequently breed resistance and opposition (Laudon and Laudon, 2006). Economic rewarding and a certain types of compulsory measures may well serve as viable motivators for the desired changes in our case.

Organizational activities targeted toward the adoption, management, and routinization of an innovation are to be guided by a change agent. The change agent's role in the process of e-learning implementation is key to ensuring the organizational adaptation to the new innovation, and this factor frequently remains unaddressed by many e-learning adopter organizations. Change management ultimately targets the creation of a new culture receptive to the innovation. In this regard, it has been strongly advised that the existing ELS team of Sahmyook University beef up its human resources with regard to further empowerment. There have been many empirical studies (e.g. Nagura and Arakawa, 2003). that also emphasize the importance of evaluation of the entire cycle of e-learning implementation.

As to the type of e-teaching, we perceive that full-time cyber-teaching with no classroom instructions is hardly appropriate for undergraduate courses, as undergraduates (particularly, in our case) have yet to fully adapt to e-learning. Rather, a blended e-learning regimen that partially utilizes the conventional classroom instructions has been deemed necessary to harvest the maximum benefits of instructions via the Internet.

E-learning in higher education is still generally considered an innovation rather than a mainstream culture and practice. The technology-oriented viewpoint, as such, will focus principally on ICT applications, which continually advance. As a consequence, both educators and learners tend to be obsessed with high-tech fads, thinking about 'how' rather than 'what' to teach and learn. For all education processes to be effective, higher education organizations must attempt discover and design the best practices of teaching and learning, combining IT innovations one way or another with conventional classroom instructions. How well e-learning will work will vary depending on the course subject, the salient characteristics of the parties, the type of ICT used, and the speed of adoption.

The adoption of e-learning calls for careful management of change. As is always the case with new system the implementation of e-learning will cause various organizational impacts. Therefore, all implementation processes, beginning with the defrosting of faculty attitudes, in particular, requires various types of support from the administration.

A large number of Korean universities, with the notable exception of the cyber-universities, are still in the early adoption phase of e-learning, and are furthermore trapped in a chasm in this regard. The attitudes of faculty and students, as well as the strategic understanding of e-learning as a component of educational reform, should be aggressively addressed. It should also be kept constantly in mind that the notion of e-learning as a panacea is a mirage.

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