

Promoting E-learning in University Education in Korea: The Role of Regional University E-learning Centers

In-Soo Han

Department of Management
Chungnam National University, Daejeon, 305-764 Korea.

Keun-Yeob Oh*

Department of International Trade
Chungnam National University, Daejeon, 305-764 Korea.

Sang Bin Lee

Department of Management
Chungnam National University, Daejeon, 305-764 Korea.

ABSTRACT

This paper aims at investigating what Regional University E-Learning Centers (RUECs) has done in promoting e-learning in university education in Korea. First, the e-learning situation in university education in Korea is introduced. Secondly, the background of establishment of RUECs and its functions are explained in detail. Thirdly, a case of RUECs is suggested by using the CNU-University E-Learning Center. In particular, the performance of e-learning is evaluated based on the student satisfaction data, and a paired-t test is implemented to see if there was any difference between 'before' and 'after' e-learning. Lastly, some suggestions are made to promote the e-learning in university education.

Key words: e-learning, Korea, university education, regional university e-learning centers

1. INTRODUCTION

Recently, much emphasis has been placed on facilitating e-learning in university education in Korea. Many universities and colleges have made efforts to build their own cyber-campuses and have developed various forms of e-learning content for their taught courses. Among them, 10 universities have been designated as "Regional University E-learning Centers" (RUECs) by the Korean government. These centers have the objective of promoting the development of e-learning content for classes. They also have many programs to facilitate the sharing of the content developed among the universities in their region.

In this paper, we sought to analyze the function and role of RUECs in promoting e-learning for university education in Korea. Additionally, the performance of the project is investigated through a case study of a regional university e-learning center. Performance is assessed in terms of class

satisfaction and formal evaluations by class participants.

2. THE E-LEARNING SITUATION IN UNIVERSITY EDUCATION IN KOREA

2.1 Definition and benefits of e-learning

Today, e-learning is in wide use in university teaching in Korea. It has been implemented in various forms from solely online teaching to functioning as a complement to conventional teaching, that is, a blended learning solution.

E-learning is defined as instruction delivered via a digital device, such as a computer or mobile device, which is intended to support learning. The various forms of e-learning are considered to have the following features [2].

- stores and/or transmits lessons on CD-ROM, local internal, or external memory, or uses the internet or an intranet,
- includes content relevant to the learning objective,
- uses media elements, such as words and pictures, to deliver content, and
- uses instructional methods such as examples,

* Corresponding author, Email: kyoh@cnu.ac.kr
Manuscript received Sep.19, 2013; revised Jul 16, 2013;
accepted Aug 03, 2013

practice, and feedback to promote learning

There are many advantages to using e-learning tools: it is available anytime, anywhere in the world, and in different languages. E-learning can take advantage of the speed, memory, and data manipulation capabilities of the computer for greater flexibility of instruction. A basic benefit is that it is self-paced and individualized, and can be done while at work or outside class. The lecture content can be repeated many times, as often as needed. Individuals involved in e-learning are no longer constrained by the need to be in a classroom at a specific location and time. E-learning systems may also use multimedia to enhance learning performance with audio, animation, graphics, and interactive video, which might make presentations more vivid and appealing.

However, one of the biggest advantages is cost saving. This is especially manifested in the business situation. An online training manager at a Korean firm mentioned that creating an e-learning module is three times less expensive than creating an instructor-led class. For example, IBM found that using e-learning technology enabled the company to trim the cost of training by \$400 million a year [8].

It is also often claimed that e-learning and class learning are equally effective [9]. A review of online learning by some scholars concurs with this: "Overwhelming evidence has shown that learning under an online environment can be as effective as that in traditional classrooms" [10].

On the other hand, e-learning can hardly free from some disadvantages. Inadequately equipped e-learning systems can result in frustration, confusion, and reduced learner interest [7], [4]. For example, some e-learning systems only present text based learning materials, which may lead to boredom and disengagement in students and prevent them from gaining a good understanding of a topic. Some of the multimedia-based systems, which are becoming available and expected to overcome these problems, also suffer from insufficient learner-content interactivity and flexibility because of their passive and unstructured way of presenting instructional content.

Table 1. illustrates the advantages and disadvantages of e-learning in comparison with traditional classroom learning.

Table 1. Traditional Classroom Learning vs E- learning

	Traditional Classroom Learning	E-Learning
Advantages	<ul style="list-style-type: none"> • Immediate feedback • Being familiar to both instructors and students • Motivating students • Cultivation of a social community 	<ul style="list-style-type: none"> • Learner-centered and self-paced • Time and location flexibility • Cost-effective for learners • Potentially available to global audience • Unlimited access to knowledge

		<ul style="list-style-type: none"> • Archival capability for knowledge reuse and sharing
Disadvantages	<ul style="list-style-type: none"> • Instructor-centered • Time and location constraints • More expensive to deliver 	<ul style="list-style-type: none"> • Lack of immediate feedback in asynchronous e-learning • Increased preparation time for the instructor • Not comfortable to some people • Potentially more frustration, anxiety, and confusion

Source: [11]

2.2 Factors affecting the e-learning

Alexander [12] proposes a more comprehensive framework for the design, development and implementation of e-learning systems in higher education. Bolliger [1] investigates key factors influencing student satisfaction with online courses. The results indicated student satisfaction with online courses is influenced by 3 constructs: instructor variables, technical issues, and interactivity. Results indicated the instrument is a valid measure of student satisfaction with online courses. Mahdizadeh [6] was designed to identify factors that can explain teachers' use of e-learning environments in higher education. It found that teachers' use of e-learning environments can be explained to a high extent by their perceptions of the added value of these environments, which in turn are substantially influenced by their opinions about web-based activities and computer-assisted learning.

2.3 Wide use of e-learning in university education in Korea

E-learning is no longer an unusual phenomenon in Korean universities. They have been eager to adopt e-learning for their regular teaching and classes. Many universities have established their own cyber campuses on their intranets and have been given incentives to make their teachers get involved in e-learning. Their efforts have also been supported by a government policy to stimulate e-learning in university education.

According to the '2010 Higher Education E-learning Survey,' 71.6% of 215 universities and colleges that responded to the survey had adopted various kinds of e-learning in their teaching. Specifically, 83.2% of universities, 59.5% of technical colleges, and 100% of cyber universities that depend on online teaching made use of e-learning in their teaching. The figures for state and private universities were 65.5% and 72.8%, respectively. Content for e-learning has been actively developed. Indeed, the number of e-learning courses was 637 in 2006, but it had increased markedly to 2,029 in 2010 [3].

3. ESTABLISHMENT OF REGIONAL UNIVERSITY E-LEARNING CENTERS

3.1 Background

In Korea, RUECs have played a central role in e-learning in the university education system. To encourage IT-based university education, the Korean Ministry of Education, Science, and Technology formulated a ‘University E-Learning Center Building Master Plan’ in 2003, which divided the nation into 10 regions and set up a regional university e-learning center in each. Under the plan, many leading universities, building consortia with smaller universities, applied to participate in the program. Initially, only two or three universities were finally approved as regional university e-learning centers by the Ministry, based on their facilities for, and commitment to, e-learning. Now, this has been extended to the 10 planned centers. When a university is designated as a regional university e-learning center, it can get certain subsidies from the government. However, the major portion of the budget for the centers is raised by the universities, with a matching fund for the project.

3.2 Functions of Regional University E-Learning Centers

3.2.1 Support for the development of e-learning content

The main task of the institution is to secure sufficient and high quality content for the purpose of teaching. To this end, the center has operated the ‘E-Learning Content Development Program’, which gives financial and technical support to professors to encourage content development. Every semester, proposals are submitted to the center by professors who want to develop e-learning content for their class and they are evaluated by a screening committee. The typical content development process at the e-learning center is shown in Fig. 1.

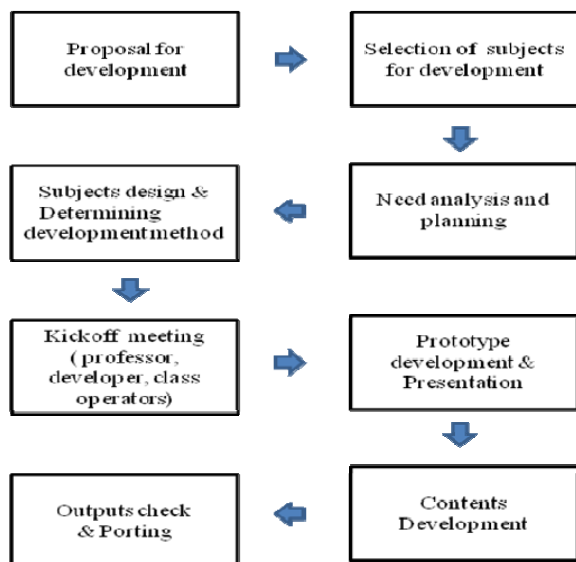


Fig. 1. E-Learning development process

Fig. 2. shows e-learning content developed by the centers for 2008 to 2010. Most of the content has been developed with government support.

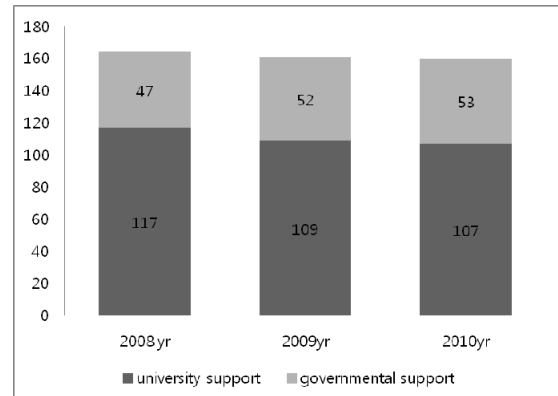


Fig. 2. E-learning content developed by regional centers (2008-2010).

3.2.2 Credit transfer among participating universities and centers

Sharing of the developed content is important in maximizing the development effect. Although most content developed at a university is mainly for teaching in the university where the regional e-learning center is located, some content is shared with other participating universities in the same region.

Many participating universities agreed to open the content of their ‘online-only’ classes to all students at other participating universities. In such cases, the credits that students received from the e-learning course can be transferred to the universities that students are attending.

This credit transfer started at the regional level, that is, among participating universities in the same region, but soon expanded to the national level, that is, other regional university e-learning centers. Now, over 100 universities participate in the scheme. Table 1 shows trends in credit transfer among the universities.

Table 1. Trends in credit transfer among the universities.

year	Participating universities in credit transfer program	In-house only class		Sharing content class			
				Intra-region		Inter-region	
		class	participants	classes	participants	classes	Participants
2008	74	1,018	155,997	311	33,131	82	5,739
2009	84	973	143,129	322	54,677	74	6,334
2010	100	1,132	144,770	337	52,614	67	6,800

3.2.3 Sharing e-learning content with the public

Sharing e-learning content is not limited to universities in and between regions. Some of the content developed by regional centers is open to the public or even to foreign nationals. This is actively encouraged by the Korean government and is considered as a contribution to the Open

Educational Resources (OCR) movement. Content is loaded on the Korea Open Course Ware (KOCW) website (www.kocw.net), which can be accessed freely. As of 2011, 8,482 course contents have been opened to the public on the KOCW website.

Thus, content developed can be used and shared at multiple levels, as Figure 3 illustrates. The use of content is at first limited to the university that supported its development, but can be expanded to the national level so that anyone can have free access to the material.

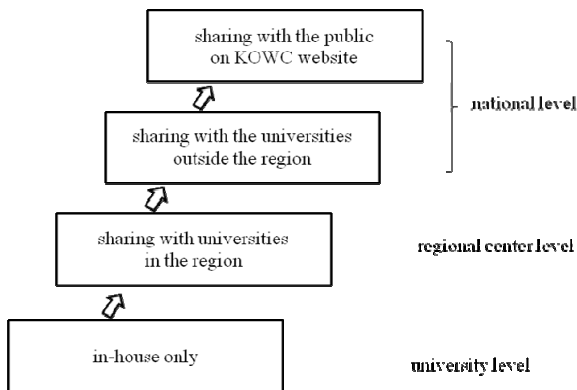


Fig. 3. The expanding use of content

3.2.4 Opportunities to continue study during military service

Military service is mandatory for Korean male students over 21 years old. For a period of 22 months, they have to leave their university, take a leave of absence, and discontinue their studies. However, e-learning provides an opportunity for students in military service to continue their studies. These students can gain credits by participating in online classes authorized by the government and those credits can be approved by the universities. As of August 2011, 101 universities and 5,637 students participated in this plan. Of these, 129 classes and 51% of the participants were covered by a regional university e-learning center.

3.2.5 Cooperation among regional university e-learning centers

The regional university e-learning centers formed the Korean Association of University E-Learning Center to facilitate cooperation among the regional centers and stimulate e-learning at the national level. It held regular seminars and conferences to discuss strategies for developing e-learning for university teaching among members. This association made an agreement about mutual credit transfer among member centers in October 2009.

4. A CASE OF THE REGIONAL UNIVERSITY E-LEARNING CENTER: THE CNU-UNIVERSITY E-LEARNING CENTER

4.1 History

Chungnam National University's (CNU) University E-Learning Center (UEC) is a regional center in charge of e-learning in the Daejeon-Chungnam area. CNU, a representative university in the Daejeon-Chungnam area, is located in the center of South Korea. Originally, CNU had a small division for the diffusion of e-learning for university teaching, for their own institutions. In 2007, a CNU-led consortium applied for a Support Program and was designated as a regional e-learning center by the Ministry of Education. Now, the center is under the leadership of the CNU-Education Development Institute.

4.2 Functions and Results

4.2.1 Support for content development for e-learning

As a regional center, the main task of CNU-UEC is the development of e-learning content for lectures. For this purpose, the center has run an E-Learning Content Development Support Program by which the center selects proposals and provides financial support for developing e-learning content. The program has two kinds of grants. One is a government grant and the other is a university grant. The former is for the subjects that have basic academic orientations, including the liberal arts areas and humanities, and the chance to apply for grants is available to all professors at participating universities in the region. The latter is given only to professors at CNU.

For selected proposals, 3.5-5 million Korean Won (USD 3,000-4,400) is given for course development. Development of some content was assisted by professional agencies, but most content was developed by professors by themselves using development assistance software, such as Activetutor, Expert, Presto, and Commoes. In each process, an original manuscript can be redesigned and improved by professional web designers. Recently, some forms of content, developed with special software, has been loaded onto smart phones, making the content readily accessible by students anywhere.

Table 2 shows annual data of the e-learning content developed by the CNU center

Table 2. E-learning content development by the CNU center

Year	Government supported		University supported	
	subjects	budget (USD)	subjects	budget (USD)
2008	5	82,600	10	100,000
2009	4	69,570	25	196,520
2010	10	69,570	31	223,478
2011	10	52,170	23	129,565
Total	29	273,910	89	649,563

4.2.2 Transfer of credits

Based on the developed content, the CNU center facilitated the transfer of credits among the participating universities in the region. As shown in Table 3, transfer of credits has been agreed for 22 subjects by the participating universities to date. The credits that students get for the subjects authorized by the center can be transferred to the universities the students attend. The numbers of participating universities, students, and subjects increased a little in 2011, compared with the previous year.

Table 3. Transfer of credits among participating universities

	No. of participating universities	Subjects	Participating students
2010 - 2 nd semester	5	10	809
2011 - 1 st semester	6	12	810

4.2.3 Offering e-learning classes to students in military service

Since 2008, the CNU center has offered some online-only classes for the students in military service so that they can continue their studies. The number of subjects and students participating in the program has increased steadily. In 2011-1st semester, five subjects and 157 students participated in the program that CNU initiated.

4.2.4 Sharing content developed with the public

Some of the content supported by the CNU center has been uploaded to the KOCW website, so as to make it available to the public. Since 2007, in total, the content of 15 courses (eight government-supported and seven university-supported) have been shared with the public through KOCW. Their subjects are: “the secrets of life and death”, “e-business”, “programming languages”, “humans and the universe”, “written and verbal language in our life”, “the world of fashion and technology”, “basic English”, “understanding e-commerce”, “introduction to university mathematics”, “history of the universe”, and “basic engineering”.

In addition, there is the Korean Association of the University e-Learning Center, KAELC). They hold many joint conferences regularly to talk about the e-learning. They share their experience and seek how to collaborate among them in order to encourage the transfer of credit, contents developing, and opening to the public.

4.3 Evaluations of e-learning at the CNU center

We will briefly assess the performance of e-learning classes supported by the CNU center in terms of student satisfaction with the e-learning and improvements in course evaluations.

4.3.1 Student satisfaction with e-learning

The CNU UEC recently conducted a survey to investigate responses of participating students to the Learning

Management System (LMS) at the cyber campus run by the CNU center. The survey was conducted online. A questionnaire was administered to 11,322 students who participated in e-learning during the first and second semesters of 2010. However, only 293 responses were returned and used in the analysis.¹

Students were asked to rate their satisfaction with online classes they participated in. In total, six Likert-type items (from 1 = strongly disagree to 5 = strongly agree) were used to measure satisfaction. Table 4 presents the survey results by gender.

Table 4. Survey results regarding e-learning

			n	mean	standard deviation
satisfaction with e-learning	course design /operation	male	188	3.98	1.01
		female	105	4.10	0.84
	instructor	male	188	3.69	1.06
		female	105	3.65	0.89
	class activities	male	188	3.47	0.98
		female	105	3.42	0.87
	evaluation /papers	male	188	3.62	1.08
		female	104	3.67	0.90
	system itself	male	188	3.60	1.04
		female	105	3.71	0.88
	general Satisfaction	male	187	3.66	1.14
		female	104	3.76	0.96

As shown in Table 4, respondents rated their satisfaction with e-learning as above average, but not very high. In particular, they reported slightly higher satisfaction with course design/operation than the other issues. Overall, female students showed more favorable attitudes to e-learning, which may indicate that female students concentrate more on lectures in class than male students.

4.3.2 Course evaluations of e-learning classes

We wanted to investigate the effects of e-learning in terms of improvement in course evaluations by students. We analyzed the courses where e-learning was adopted during a semester. The courses had been taught even before the semester. In CNU, for all the classes, when a semester is finished, every student is asked to answer the evaluating questions before they check their academic grade. If they do

¹Actually this reply rate might look too low even though 293 is not very small number.

not answer the questions, they cannot check their grade from the course. In the paper, we analyzed the evaluation results of a course where the lecturer was taught using e-learning

contents. We compared the results for the same course from two semesters and checked if there was any change after the e-learning was adopted.

Table 6. What the students want from e-learning

		N.A.	not greatly needed	not needed	neutral	needed	needed very much	total
various forms of learning content and methods	N	3	3	6	42	154	85	293
	%	1.0%	1.0%	2.0%	14.3%	62.6%	29%	100%
motivation for learning	N	4	2	11	23	141	112	293
	%	1.4%	0.7%	3.8%	7.8%	48.1%	38.2%	100%
sufficient loading and guidance for learning materials	N	5	2	6	53	138	89	293
	%	1.7%	0.7%	2.0%	18.1%	47.1%	30.4%	100%
communication among learners	N	3	1	12	30	109	138	293
	%	1.0%	0.3%	4.1%	10.2%	37.2%	47.1%	100%
tutor's help in learning	N	3	3	9	57	124	97	293
	%	1.0%	1.0%	3.1%	19.5%	42.3%	33.1%	100%

We used the closest semesters in comparison. For example, if a course adopted the e-learning method in Fall 2011, we compare the student evaluation for the Fall semester of 2010 and that for Fall 2011. (The courses are offered once a year.) We call the case of Fall 2010 as “before” and call Fall 2011 as “after”.

The paired t-test was used to compare the means of the course evaluations before and after e-learning in 17 classes for which data were available. Surely, there could be more variables we have to care. However we had no more chance to put other variables for better research because the course evaluation has been done by the university for a long time.

Courses were evaluated by students using Likert type scale (1 = very dissatisfied, 5 = very satisfied). Table 5 shows the results.

Table 5. Course evaluations before and after e-learning

	before e-learning (n = 17)	after e-learning (n = 17)	t
mean of course evaluation	4.136	4.287	-2.357*

*p < 0.05

As shown in Table 5, the mean difference of the course evaluations before and after e-learning was statistically significant. It seems that the course evaluation was slightly better after e-learning had been adopted in the classes. It is interesting that the professors in the study got relatively high ratings (over 4 points), regardless of the adoption of e-learning. This is higher than the average of all classes. This may indicate that the professors who committed themselves to e-learning

were already highly rated by the students generally.²

4.4 Challenges for e-learning at the CNU center

Some output data suggested that e-learning at the CNU center produced positive results. However, it still has a long way to go. In a survey, students were also asked to mention what was needed to improve the e-learning in which they had participated. Table 6 shows the results

As shown in Table 6, “communication among the learners” is what the students wanted most in e-learning. They felt that they needed to communicate more with each other in the process of e-learning. Technically, such provision is not very difficult. Additionally, the students also need ‘motivation for learning’. This indicates that more enthusiasm and skills are required to stimulate e-learning on the professor’s side. Students want more communication with the professors as well as with each other.

5. CONCLUSIONS

To date, we have looked at the role of regional university e-learning centers in promoting e-learning in university teaching. It is clear that these institutions have contributed to the development of e-learning content and to initiatives for sharing content among universities in the same region, with

²Of course there could be many confounding variables other than e-learning, which could weaken the validity of the paper. But consider that Kellera [5] examines students’ perceptions of e-learning taking students at Jönköping University in Sweden and found that the strategy of implementing the e-learning system at the university was more important in influencing students’ perceptions than the individual background variables.

universities outside the region, and even with the public. E-learning also leads to higher course evaluations by participating students. On the quantitative side, it is no exaggeration to say that e-learning initiatives have achieved remarkable success in a short time. On the qualitative side, however, much remains to be improved.

Based on the analysis presented here, some suggestions can be made for promoting e-learning in university teaching.

First, instructors should fully commit to e-learning. They have to enhance their skills in operating e-learning classes and invest more time in giving feedback to their students, and in motivating them for learning. Continuous training courses for instructors are essential to enhance the effectiveness of e-learning.

Second, learning systems need to be designed and operated to provide a forum where students can freely discuss issues and topics with each other online. Through such interaction, they can be motivated to be more involved in e-learning.

Third, e-learning systems operated by regional university centers have to be upgraded, based on continuous two-way communications between centers and participating students, to ensure the effectiveness of e-learning.

ACKNOWLEDGMENT

This work was supported by research fund of Chungnam National University in 2012.

REFERENCES

- [1] Bolliger, Doris, "Key Factors for Determining Student's Satisfaction in Online Courses", *Journal on E-Learning*, vol. 3, no. 1, 2004, pp. 61-67.
- [2] Clark, Ruth C. and Richard E Mayer, *E-Learning and the Science of Instruction: Proven Guidelines for Consumers*, San Francisco, CA: Pfeiffer, 2003.
- [3] CNU University E-Learning Center, *LMS (Learning Management System) Survey Report*, 2011. 2.
- [4] Hara, N. and R. Kling, "Students' Distress with a Web-based Distance Education Course: an Ethnographic Study of Participants' Experiences", *Information, Communication and Society*, vol. 3, no. 4, 2000, pp. 557-579.
- [5] Kellera, Christina and Lars Cernerudb, "Students' Perceptions of E-learning in University Education", *Journal of Educational Media*, vol.27, issue 1-2, 2006, pp. 55-67.
- [6] Mahdizadeh, Hossein, H.Biemans, M. Mulder, "Determining factors of the use of e-learning environments by university teachers", *Computers & Education*, vol. 51, issue 1, 2008, pp. 142-154.
- [7] Maki, R.H., W.S. Maki, M. Patterson and P.D. Whittaker, "Evaluation of a Web-based Introductory Psychology

Course: Learning and Satisfaction in Online versus Lecture Courses", *Behavior Research Methods, Instruments, and Computers*, vol. 32, no. 2, 2000, pp. 230-239.

- [8] Roger C. Schank, *Designing World-class E-learning: How IBM, GE, Harvard Business School, and Columbia University are Succeeding at E-learning*, McGraw-Hill, 2002.
- [9] Sitzmann, T., "Is E-learning as Effective as Classroom Learning?", *T+D*, vol. 59, 2005, p. 18.
- [10] Talent-Runnels, M.K., J.A. Thomas, W.Y., Lan, S. Cooper, S. M. Shaw and X. Liew, "Teaching Courses Online: A Review of the Research", *Review of Educational Research*, vol. 76, no. 1, 2006, pp. 93-135.
- [11] Zhang, Dongsong, J. Leon Zhao, Lina Zhou, Jay F. Nunamaker, "Can E-Learning Replace Classroom Learning", *Communications of the ACM*, vol. 47, no. 5, 2004, pp. 75-79.
- [12] Alexander, Shirley, "E-Learning Developments And Experiences," *Education + Training*, vol. 43, no. 4/5, 2001, pp. 240-248.



In-Soo Han

He received the B.S., M.S in management from Seoul National University, Korea in 1975, 1977 respectively and also received Ph.D. in management from Seoul National University, Korea in 1990. Since 1981, he has been a professor in Department of Management, Chungnam National University, Korea. His main research interests include Human Resource Management, Technology Management, Innovation.



Keun-Yeob Oh

He received the B.A., M.A in international economics from Seoul National University, Korea in 1982, 1984 respectively and also received Ph.D. in economics from Ohio State University, USA in 1994. Since 1995, he has been a professor in Department of international Trade, Chungnam National University, Korea. His main research interests include International Trade, Intellectual Property Rights, and Innovation.



Sang Bin Lee

He received the B.A. and M.A. in Political Science, from Hannam University in 1989 and Chung-Ang University in 1994 respectively and received Ph.D. in Political Science from Peking University, China in 1999. Since 2002, he has been a research professor in Chungnam National University, Korea. His main research interests include Politics and Economy of China, Property Rights System, and Industrial Cluster.