Globalization of Engineering Education in Asia

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Abstract

The Asian Conference on Engineering Education has organized and is held in Busan. This paper tells the steps for the process of planning of this conference. Firstly, the Innovation Center for Engineering Education in Korea Maritime University and the Center for Innovation and Creativity Development in The University of Tokushima signed the mutual interchange agreement on engineering education in 2005. The interrelation of both centers has made a continuous relation by mutual visiting of teachers and students. The first symposium on engineering education between the two universities was held in 2006. Three symposia were succeeded until now. By the way, the Japanese five-university coalition of engineering education was composed in 2004. This five-university coalition annually held the symposium on engineering education. Two teachers and two students of each university participated in the symposium and introduced their activities. Annual symposium was held every year from 2004 to 2008. Based on these two kinds of symposium, we have planned to enlarge the relationship by including partner universities in both countries. The capstone design coalition on engineering education between the Center for Innovation and Creativity Development in the University of Tokushima and the innovation center for engineering education in Korea Maritime University are introduced. The interrelation of both centers has held by mutual visiting of teachers and students during four years. The capstone design activities of Korea Maritime University and the students' creative design projects of the University of Tokushima were introduced each other. This coalition is planned that it needs to be enlarged by including partner universities in Asian countries.

Keywords: Globalization, Engineering Education, Asia, Asian Conference on Engineering Education(ACEE)

Ⅰ. Introduction

The conference of the ACEE 2009 first began as a monor joint conference for some related departments at Korea Maritime University and the University of Tokushima during four years from 2005. The Innovation Center for Engineering Education, Korea Maritime University, and the Center for Innovation and Creativity Development, the University of Tokushima signed the mutual interchange agreement on engineering education in 2005. The interrelation of both centers has made a continuous relation by mutual visiting of teachers and students. The first symposium on engineering education between the two universities was held in 2006. Three symposia were succeeded until now. On the other hand, the Japanese five-university coalition of engineering education was composed in 2004. This five-university coalition annually held the symposium on engineering education. Two teachers and two students of each university participated in the symposium and introduced their activities. Annual symposium was held every year from 2004 to 2008. And the Center for Innovation and Creativity Development of the University of Tokushima and the Innovation Center for Engineering Education of Korea Maritime University signed the mutual interchange agreement on engineering education in 2005. The interrelation of both centers has made a continuous relation by mutual visiting of teachers and students. The first symposium on engineering education between the two universities was held in 2006. Three symposia were succeeded until now.

Based on these two kinds of symposium, we have planned to enlarge a relation by including partner universities in both countries. In the beginning stage,

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the framework between Japanese five-university coalition and Korean four-university NURI project team was the favorite of the international conference. However, the vision of a framework between Korea and Japan was happened to consider the occasion of the Annual Meeting of the Korean Society for Engineering Education held in Jeju Island in 2008. After that, in a stage of making the first circular, this framework was further enlarged to the Asian conference. The important vision of the meeting is that teachers and students should be together in a same space where a free discussion is possible and is firmly inherited to this conference.

The current engineering education is criticized for having greatly grown in quantitative terms by fostering large engineering workforce but for being weak in terms of qualitative competitiveness. In the face of such circumstances, we will get together to discuss with each other how to achieve the innovation of engineering education and to highlight its importance on the occasion of this conference. Currently, the knowledge-based society of the 21st century requires an overall reform of engineering education to foster the engineering manpower equipped with creativity and problem-solving abilities and to prepare for a future society. Accordingly, changes and innovations are required in many sectors of the current engineering education with the drastic development and fusion of technologies and the transformation of economy from imitation to creation. Such requirements have driven us to hold this ACEE 2009. We hope that this occasion will contribute to the development of the engineering education in the Asian area into that of international standards.

Under the subject “Asian Conference on Engineering Education 2009(ACEE 2009)”, will include lectures and seminars of the experts at Asian universities and industries and academic exchanges between students, playing a role of a knowledge-sharing opportunity for its participants.

We expect that ACEE 2009 will greatly contribute toward the innovation of Asian engineering education by sharing information and data with reference to the global standards of engineering education, solving problems together through discussions and proposals and offering useful tips to each other.

The ACEE 2009 was glorified by the attendance of you who were much interested in engineering education and will lay groundwork for developing the models of engineering education that meet the 21st century requirements.

The two centers of the Korea Maritime University and the University of Tokushima were established in 2003, and 2004, respectively. The aims of two centers are (1) to develop creative methods in education and learning, (2) to develop methods for evaluating an attainment of outcomes, (3) to open and extend outcomes of the activities in the center and (4) to form an educational coalition with other universities.

The characteristics of the center is the project-based activity in which the students perform their activities in the way that the members in different fields and different school ages make a group team and design a project by themselves. Activities are performed by themselves. In order to perform these activities, the Center for Innovation and Creativity Development prepares an innovation plaza an a practicing field for the students, where they work under the concepts characterized by the following items:

(1) projected-based activities: Students will propose a subject by themselves.

(2) team activity: More than two persons will gather together to make a team.

(3) activities beyond a fence of field and grade: Students will join and make a team beyond their field and their student age.

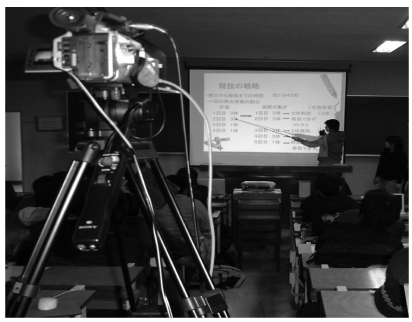
According to the fourth aim of the center, a cooperative frame was concluded between the Center for Innovation and Creativity Development of the University of Tokushima and Center for Innovation of Education of Korea Maritime University in 2005. The main object of this coalition is (1) to exchange teachers and students (2) to develop new educational programs of on a creative learning and (3) to perform cooperative project activities

II. Mutual Visiting between KMU and TU

In accordance with the object of the coalition, four times of interchange were achieved in the last school year, 2005. Two of them were a teacher's interchange from Tokushima University to Korea Maritime University and from Korea Maritime University to Tokushima University. The first meeting was held at

Tokushima University on August 2005. In this meeting, the engineering education in Korea Maritime University and the activities of the Center for Innovation and Creativity Development were explained each other. The second meeting was made at Korea Maritime University on November 2005. At this time both center concluded a mutual agreement an engineering education.

On the third meeting at the University of Tokushima on January 2006, three students of Korea Maritime University visited the University of Tokushima and reported on design subjects in Korea Maritime University. This meeting was a special one where a tale-communication using Japan Giga-bit Network 2(JGN2) was made. This was the first trial between the University of Tokushima and Kumamoto University. One of the present authors, professor Yun-Hae Kim, reported on capstone design projects in Korea Maritime University. The students and the teachers of both universities attended this lecture meeting. The picture projected on a screen was very clear and a small delay of the sound was out of problem. The tale-communication method will



[Fig. 1] Tele-communication between Tokushima University and Kumamoto University using Japan Giga-bit Network(by Prof. Yun-Hae Kim in Japan)

[Fig. 2] Visiting Tokushima in Japan for the Years of 2008-2009

be an excellent means for the education system. The fourth meeting was held at Korea Maritime University and in this case three students of the University of Tokushima visited Busan. They were engaged in the project activities in the Innovation Center and reported their works.

Along with the mutual exchange, a cooperative project on solar boat has been developed. The members of the project teams exchange their plan each other in the third and forth meeting.

And for the years of 2008-2009, we have planned the LED project, robot contest project and solar boat project, have exchanged opinions with each other, and have carried out the projects. These projects have become the bases of ACEE 2009 and the experience of scientific exchanges between two countries for the past 4-5 years could become the groundwork

Ⅲ. Asian Conference on Engineering Education 2009

Each university has a partnership with other domestic universities. The University of Tokushima has a framework with Yamagata University, Gunma University, Ehime University and Kumamoto University. We call this frame a coalition among five universities. Since 2003, these five universities have opened an educational symposium where teachers an well as students join together to report and discuss problems on engineering education. Especially, the students who attend the symposium feel good pleasure for having a chance to express their learning activities and to have mutual exchange among students and teachers from other universities. They felt a new image on education after learning active projects that were performed at the other universities.

Korea Maritime University also constructed a cooperative system with three universities in Korea on the capstone design program. The capstone design program is almost the same with the concept of design subjects that has been developed throughout an engineering education in Japan. The students themselves consider a theme to investigate, design a method to establish their plan and practice it to make a fruit of their effort. This program intends to promote teamwork ability and communication skill and to let the students have an experience to solve real problems in an engineering field.

Important point on a students' learning is to notice excellent activities of other universities. To recognize other projects encourages their activities. Especially, international communication will be very useful for students. For many students of the undergraduate course, who attend these projects, it must be a great experience that they have a chance to contact and work together with friends from foreign countries. The organizations (such as the Center for Innovation and Creativity Development of the University of Tokushima and the Innovation Center for Engineering Education of the Korea Maritime University) involved in this project in 2008 got together to organize the ACEE 2009 and the related organization members have taken a number of opinions to prepare for the subject and overall plan of ACEE. As the result, ACEE was held at the Korea Maritime University for the period of on October 28~30, 2009.

Ⅳ. Summary

The international coalition between the Center for Innovation and Creativity Development of The University of Tokushima and the Center for Innovation for Korea maritime University has started. By introducing each method of education or learning, we can develop a new system in the education of the university. Mutual exchange of teachers as well as students gives fruitful results for development of a new type of education system. The international coalition between two universities is now planned to develop into a large coalition including other universities.

In order to utilize the advantages of education between two countries as much as possible, we are to hold the ACEE 2009 based on the members shown on [Fig. 3]. We have already collected the opinions of relevant members and have agreed upon to hold the 1st ACEE in Korea. And, a lot of things have been done. Also, the organizations such as Korea Institute for the Advancement of Technology (KIAT), Korea Society for Engineering Education (KSEE), Japan Society for Engineering Education (JSEE), and Ministry of Education, Science and Technology (MEST) have supported our scientific conference.

The subject of scientific conference is largely divided into two groups of students and professors and the

[Fig. 3] Homepage of ACEE2009

[Fig. 4] Opening of Acee2009

subjects of participating students are the capstone design, project activities, learning and activities in the university, volunteer and social service activities, and others.

The subjects of participating professors were the project based learning, problem based learning, basic engineering education, engineering service learning, international coalition in engineering education, examples of innovative engineering education, general engineering education for women and others.

Through this scientific conference (Fig. 4), we have built firmly the cooperative system of engineering

education among Asian countries and have had an international scientific conference that could grope for a development direction of engineering education as well as friendly relations between professors and students. At this moment, this conference looks like a conference among Asian countries but we hope to make a place of scientific exchanges for the improvement of engineering education in the world through the participations of universities and colleges from other the world countries.

The 2nd Asian Conference on Engineering Education will be held in Tokushima, Japan, in 2011.

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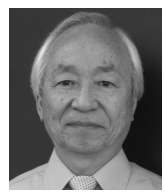

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