An Effective Program to Improve Cooperation of Non-engineering Professors for Accreditation Specialized General Education

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Abstract

This paper aims to propose an effective program for open discussion amongst professors with various majors to manage accreditation specialized general education (ASGE) including math, science, computer science (MSC) and liberal arts for professionals (LAP) and to improve its contents. Although SGE is as important as major courses to nurture successful engineers, it is hard that non-engineering professors who teach SGE fully understand the significance of SGE for engineering students, and that opinion from engineering professors affiliates ASGE. Moreover, engineering professors have little interest in the contents of LAP and put small effort to appreciate the necessity of LAP. As the first step to solve the problem, a ground is required to gather engineering professors and non-engineering professors of SGE and to exchange ideas about how to run and what to teach ASGE.

Handong innovation center for engineering education developed a program called "Engineering Lunch", and has operated it regularly as effective communication ground between engineering professors and non-engineering professors. The program is open to any faculty members and a topic related with engineering education is presented and discussed in 60 minutes of lunch time every Friday. Mostly, the topics are LAP related and the speakers are currently LAP teaching professors. Topics discussed so far were innovative example benchmarking, psychology, English education, engineering ethics, interdisciplinary engineering education, writing, sociology, law, business and management.

Introduction

As the number of engineering colleges that adopt ABEEK (Accreditation Board for Engineering Education of Korea) is increasing in Korea, the importance of liberal arts education for engineering students are being recognized more and more. Those liberal arts education is called ASGE (Accreditation Specialized General Education) consists of MSC (math , science, and computer skill) and LAP (Liberal Arts for Professionals). MSC is very important for strong background of understanding major subject knowledge. The MSC courses are also important for life-long self education and understanding of other majors. LAP includes engineering ethics, technical writing, law, management, leadership, communication, human skill, engineering and science philosophy. The LAP courses are critical subjects for self education and career development. KEC2005[2], the ABEEK Standard, requires all the engineering students to take 30 credit hours in MSC courses and 18 credit hours in LAP courses. And, the KEC2005 also requires each student should achieve seven non-engineering soft-skill-related outcomes such as basic science and math, life-long education, understanding the impact of engineering, engineering ethics, ability to work at international culture, interdisciplinary teamwork, and communication. These outcomes are tightly related to the potential of engineers' growth as leaders in the industrial field. Table 1 is a survey result from industry implying the importance of ASGE courses.

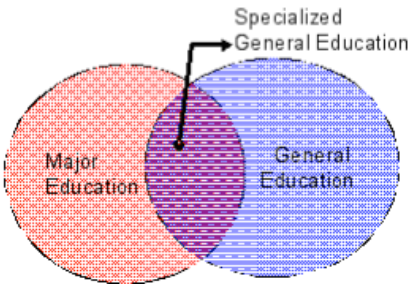
Table 1. Main concern of Industry for recruitments [1]

Evaluation items to be considered	
Attitude	32%
Communication Skill	26 %
Foreign Language Proficiency	17 %
Computer Skill	13 %
Major Knowledge	4 %
Common Sense and Contemporary Issues	3 %
Others	5 %

Since the items shown in the Table 1 cannot be totally covered by the major subject courses, the specialized liberal arts education such as LAP is needed. The Figure 1 shows the context of SGE. SGE should be delivered under the context of field situation. It means the teaching contents should reflect the engineering field characteristics and the lecturers should understand the unique characters of engineering students.

But, the problem is that these SGE courses are not properly provided from the view point of the intended original ASGE objectives. Most of the lecturers of ASGE courses lack in understand the context of engineering students. Therefore, the communication between engineering professors and lecturers of ASGE is important. Lecturers of SGE need to get feedback from engineering departments while engineering professors need to understand the overall contents the SGE courses. Usually, engineering professors have no interest in the liberal arts course and very ignorant what are taught in those LAP courses. These are not desirable because the engineering field requires the engineers to have wider and more general capability as well as specific major capabilities to be successful professionals. The gap between engineering education and the liberal arts education, especially ASGE, should be minimized for quality improvement of engineering education and effective ASGE education for engineering students.

Figure 1. the Context of SGE



Although ASGE is as important as major courses to nurture successful engineers, it is hard that non-engineering professors who teach ASGE fully understand the significance of ASGE for engineering students, and that opinion from engineering professors affiliates ASGE. Moreover, engineering professors have little interest in the contents of LAP and put small effort to appreciate the necessity of LAP. As the first step to solve the problem, a ground is required to gather engineering professors and non-engineering professors of SGE and to exchange ideas about how to run and what to teach ASGE.

The HICEE (Handong Innovation Center for Engineering Education) developed a program called “Engineering Lunch”, and has operated it regularly as effective communication ground between engineering professors and non-engineering professors. The program is open to any faculty members and topics related with engineering education is presented and discussed in 60 minutes of lunch time every Friday. Mostly, the

topics are LAP related and the speakers are currently LAP teaching professors.

In this paper, we will show the program operation and the guideline for more advancement of the program. In

chapter 2, the operation principles of the program is shown and in chapter 3 the details of the program in two years is shown. In chapter 4, evaluation and future work are discussed.

2. Principles and Purpose of the Engineering Lunch Program

Handong Innovation Center for Engineering Education developed the Engineering Lunch Program with the following principles and purposes.

2.1 Target Audience

We invited all the faculty members of Handong Global University. But, we expected our audience and attendance mainly from faculty members from engineering school and faculty members who teaches SEG for engineering students.

2.2 Purpose of the program

A. Sharing the Research Results on the Engineering Education
B. Sharing the Academic Idea between Engineering Professors and Non-Engineering Professors.
C. Giving Feedback to General Education Professors from Engineering Professors
D. Expanding the Understanding on the Engineering major among the non-Engineering Professors.
E. Envoking and Expanding the Interesting in the Humanities and Social Science among the Engineering Professors.

The main objective of this meeting is to providing the chance of meeting and sharing the academic and educational ideas among professors from various non-engineering background and engineering professors. Through these small group meetings including presentation professors who are in charge of MSC and LAP courses for engineering students may enhance their understanding the engineering majors. And, those professors who teach the MSC and LAP courses can get feedback from engineering professors with regard to the educational expectation through the liberal arts education. Finally, it also aims to provide a space and chance for fusion and interdisciplinary academic interaction between professors with various backgrounds.

2.3 Range of Topics Covered

Any topics on the education and overview about the course contents of non engineering courses are welcomed to this meeting. Most of topics to be covered are related to the engineering education. They could be topics of specific courses, a set of courses related each other, an innovative teaching method especially for engineering students, an analysis of the students performance, or the overall engineering education system. Benchmarking reports and success stories from other institution are also covered. The main topics covered by this program are listed below.

A. Improving the education of LAP courses for engineering students
B. Improving the education of MSC courses for engineering students
C. Communication Skill and Foreign Language Skill Education
D. Innovative Engineering Education
E. Benchmarking of Engineering Education
F. Interdisciplinary education
G. General Topics on the Higher Education and Counseling

2.4 Invited Speakers

We invite various speakers from various backgrounds. In the early stage of the program we tried to invite speakers from the professors who involved with the innovative engineering education project of HICEE to focus on the engineering education method itself. Afterwards, we expanded the scope of speakers to various professors who teach MSC courses and LAP courses including managements, English, leadership, law, and writing skills.

2.5 Operations

We had the regular meeting on the lunch time (12:45 – 13:45) on every Friday with lunch. The budges comes from

the project funds for Innovation of Engineering Education supported by the Korean governments. Every professor on campus are invited via email. We sent announcement email regularly. Every seminar is recorded by video. During lunch time, seminar is delivered and discussions are followed.

3. the Details of Engineering Lunch Program

Here we summarize the operation of the program during a year 2008. We provided lunch to attract people to the program and tried to select interesting topics that most professors want to learn. We had 10 meetings and 12 meetings in the spring and in the fall semester respectively.

The details of engineering Lunch Program of the spring semester 2008 are listed in the Table 2. There were nine meetings of engineering lunch in the spring semester. It was the first time of engineering lunch. Thus, the program was mainly focused on the engineering education itself including benchmarking report of foreign universities in USA and Europe which are top in innovative engineering education and the summart of Engineers in 2020 report from National Academy of Engineering (NAE) which predicts the trend of engineering job environments in the near future and gives an implication on the direction of change in engineering education for US society.

Table 2. List of Engineering Lunch Seminars in 2008 Spring

	Date	**Topics and Speakers**
1	Mar. 14	- Topic : Benchmarking report of Harvey Mudd College in US - Speaker : Prof. Yun-Shik Han
2	Mar. 21	- Topic : Benchmarking report of Innovation University in Finland - Speaker : Prof. Sang-Mo Jung
3	Mar. 28	- Topic : Summary of Engineers in 2020 of NAE [3] - Speaker : Prof. Kang Yi and Prof. Jong-Sun Lee
4	Apr 4	- Topic: Survey on Engineering Ethics Education in Korea - Speaker: Prof. Hwa-Chul Son (School of Liberal Arts)
5	Apr 11	- Topic : Loving the kingdom and responsible technology - Speaker : Prof. Arie Leegwater from Calvin College
6	Apr 18	- Topic: Brain, Emotion, and Human Relationship - Speaker: Prof. Sung-Mahn Shin (School of Counseling)
7	May 2	- Topic : Christian Engineering : Practice in Research and Teaching - Speaker : Prof. Soo-Young Jhang from POSTECH
8	May 16	- Topic: Integration of Mission and Engineering - Speaker : Prof. Young-Gurl Kim from John Brown Univ in US.
9	May 23	- Topic : English Education for Engineering Students - Speaker: Prof. Julia Missie (Department of Language Education)
10	May 30	- Topic : the Best Teacher, Jesus Christ - Speaker : Prof. Hee-Gahb Lee

The details of engineering Lunch Program of the fall semester 2008 are listed in the Table 3. We had twelve meetings in fall semester in 2008. Since this time is the second Engineering Lunch we invited speakers from more various fields including management, leadership, education, Korean language, communication, law, and theology. We also had emphasis on the sharing the idea of new direction of Handong Innovation Center for engineering education, which is the integration of engineering education and mission. It means to help the people living in the underdeveloped countries through engineering design skills. The semester #4 and #7 are the meeting to share and spread the idea of next direction of the center.

Table 3. List of Engineering Lunch Seminar in 2009 Fall		
	Date	**Topics and Speakers**
1	Sep 26	Topic : report on ASEE Speaker : Prof. Kang Yi
2	Oct 10	Topic : Entrepreneurship Speaker : Prof. Ki-Hong Kim
3	Oct 17	Topic : Management for Engineers 1 Speaker : Prof. Young-Jin Kim
4	Oct 24	Topic : Global Service-Learning & Holistic Mission Speaker : Prof. Yun-Shik Han
5	Oct 31	Topic : Mentoring Speaker : Rev. Young-Gyu Lee
6	Nov 07	Topic : What is Education ? Speaker : Prof. Eun-Shil Lee
7	Nov 14	Topic : Progressive Model of Integrated Mission Speaker : Missionary Tae-Min Kim
8	Nov 21	Topic : MEMO/TRIZ Speaker : Prof. Jae-Young Lee
9	Nov 28	Topic : Writing Speaker : Prof. Jong-Rok Kim
10	Dec 05	Topic : Management for Engineers 2 Speaker : Prof. Yong Lee
11	Dec 12	Topic : Sociological Mind Speaker : Prof. Jong-Wook Hur
12	Dec 19	Topic : Faith and Law Speaker : Prof. Hee-Eun Lee and Prof. Enlow

The number of attendants of spring semester and fall semester in 2008 is shown in Figure 2 and Figure 3 respectively. The average number of attendants in spring semester and fall semester is about 20 and 17 respectively.

Figure 2. Number of Attendants of Engineering Lunch in Spring Semester in 2009

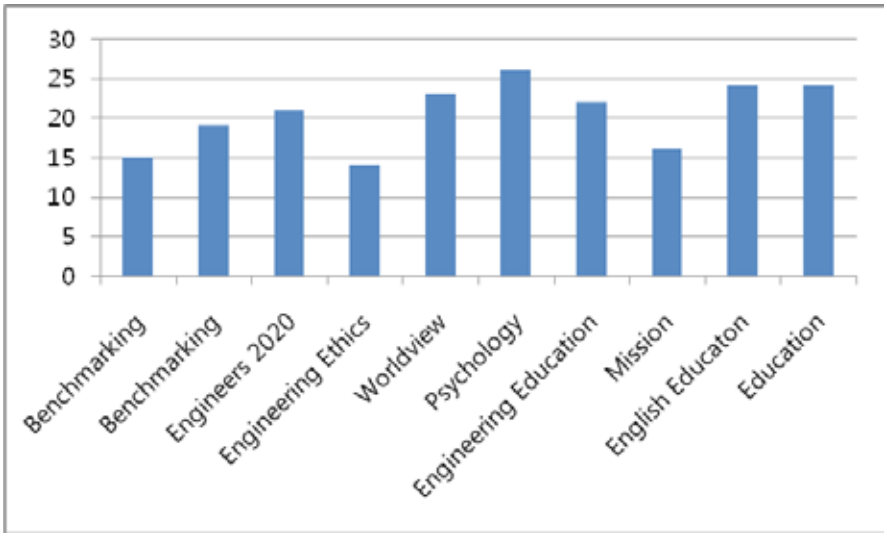
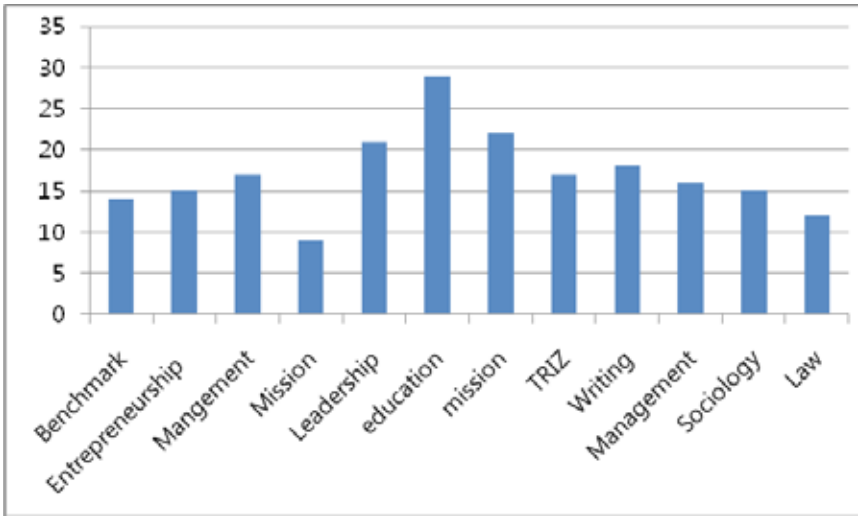


Figure 3. Number of Attendants of Engineering Lunch in Fall Semester in 2009.



4. Evaluation and Conclusion

We performed a survey on the Engineering lunch program for past one year. We asked the attendants to answer the survey questions and we got the response as shown in Figure 4 and Figure 5.

Figure 4 Answer for "Was the Engineering Lunch Program useful?"

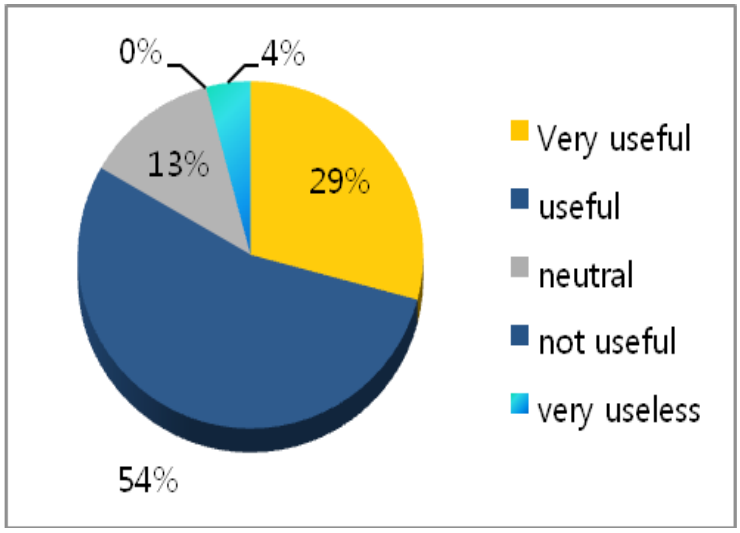
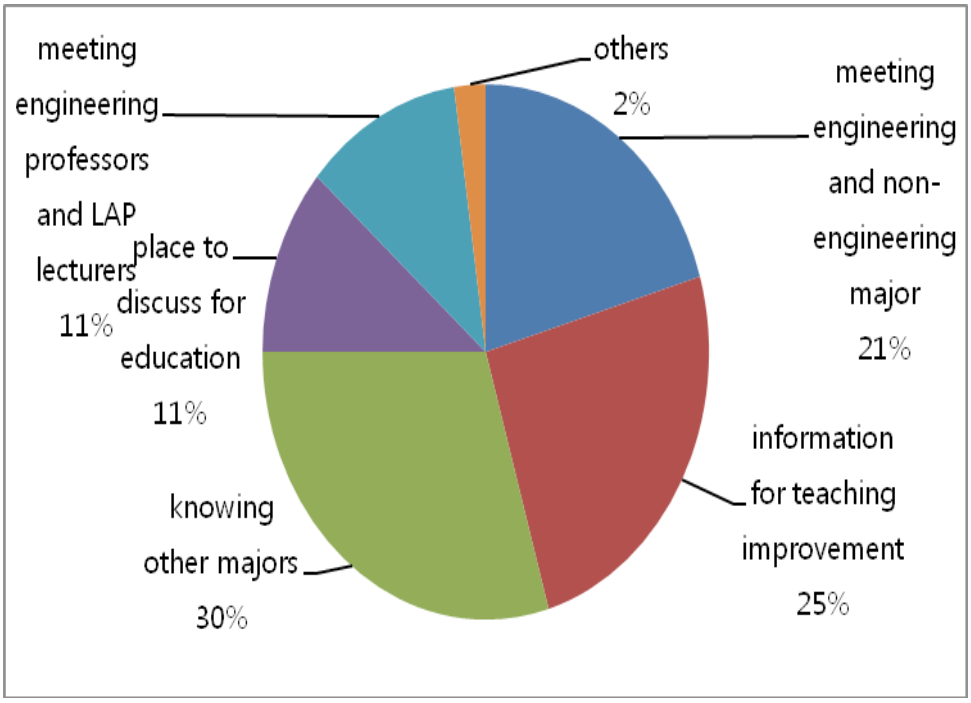


Figure 5. Answer for “Why was the Engineering Lunch useful to you ?”



The responses shown above imply that most attendants were satisfied and they satisfied mainly because they could meet people from other majors and have chance to discuss on the education of their students.
We also got answers of open questions to listen more opinions from the attendants. Most of their recommendation are to make quality improvement of the contents delivered.

The engineering lunch program was very meaningful to faculty members who has interests in education. The first one year pilot program was relatively successful. But, We think the next step toward 3rd and 4th year engineering lunch program should be more focused on contents quality. In order to improve the program we have to diversify the contents and pursuit the depth of contents. And we need to consider to invite speakers from other universities.

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