Effect of Accreditation on Graduate Employment Rates in the Same Field as Their Majors at the University of Seoul

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Abstract

The effect of ABEEK (Accreditation Board for Engineering Education of Korea) accreditation on graduate employment rates in the same field as their major at the University of Seoul was investigated for graduates over the last 3 and a half years (September 2009 - February 2013). Comparison of mathematics-science-computer (MSC) credits acquired, design credits acquired, and grade point average (GPA) of the ABEEK accredited and non-accredited graduates showed that the accredited graduates acquired 12.9 MSC credits and 11.4 design credits more than the non-accredited graduates, and the GPA of accredited graduates was higher by 0.16 points out of 4.5 than that of non-accredited graduates. The total employment rates of accredited and non-accredited graduates were 82.7% and 70.4%, respectively. When we consider the same field employment only, the average employment rates of accredited and non-accredited graduates become 76.7% and 62.5%, respectively. Thus, the total employment rate of the accredited graduates was 12.3% higher than that of non-accredited graduates, whereas the same field employment rate of the accredited graduates was 14.2% higher than that of non-accredited graduates. These results suggest that the ABEEK programs at the University of Seoul are beneficial for students in finding employment by motivating them to acquire more credits in design and MSC courses and better academic achievements. These results also suggest that the ABEEK program makes a meaningful contribution to accredited graduates in finding jobs in the same fields as their majors.

Keywords: *Accreditation, Employment Rate, Grade Point Average, Design Credit*.

1. Introduction

Over the last decade, a considerable number of engineering and computer science colleges in Korea (as of September 1, 2013, 604 programs in 101 universities) have introduced and now operate an engineering education accreditation system for the improvement of the quality of engineering and computer science education. The engineering education accreditation system is being promoted by the Accreditation Board for Engineering Education of Korea (ABEEK) to encourage the development of new creative approaches to innovative engineering education. It guarantees that graduates who have completed the program are well prepared to perform the engineering work needed in industries. As a major benefit of the accreditation for students, ABEEK provides superior employment competitiveness through the completion of demand-oriented education. Furthermore, through agreements with major companies including Samsung Electronics, LG Electronics, and SK Hynix, ABEEK emphasizes that accredited graduates will receive such benefits as preferential treatment in document screening processes for new employees, or additional points during job interviews [1]. Despite these benefits, there have been continuous claims that the actual effects felt by accredited graduates are insignificant. In particular, according to recent press reports such as "After Ten Years of Engineering Education Accreditation System, both Students and Professors are Dissatisfied" [2] and "The Truth and Falsity of the

Accreditation Board for Engineering Education of Korea: It won't do anymore" [3], both students and graduates are skeptical about the effects of the engineering education accreditation system, and in fact, many students have doubts about whether it provides realistic assistance to their employment.

Recently, we first reported a preliminary result from a case study on the effect of the Engineering Education Accreditation program on the employment rate of graduates over one and a half years (September 2009-Feb 2011) from the University of Seoul [4]. The preliminary study suggested that the engineering education accreditation at the University of Seoul was beneficial in helping graduates find employment by motivating them to develop personal and interpersonal skills effectively. However, the total employment rates for accredited and non-accredited graduates included graduates whose employment was in a different fields than the graduates' majors. There was no known relationship between the employment rate of graduates in fields different than their majors, and the accreditation. This study, thus, excluded the employment of graduates who were hired on field different from their majors, and considered only the employment rate for students hired in the same field as their majors. This study also expanded the previous study by analysing the actual effects of the engineering education accreditation on the employment of accredited graduates hired in the same fields as their majors for the last 3 and a half years (September 2009 - February 2013) through a case study at the University of Seoul. The authors of this paper anticipate that this study will stimulate further studies on the effectiveness of the accreditation.

2. Background

According to research carried out by the Korea Educational Development Institute, communication skills, ethics, sincerity, and positivity were important qualities which companies required of new college-graduate employees. [5] Likewise, the Korea Chamber of Commerce and Industry placed high importance on manners, sincerity, and teamwork abilities. [6] The Korea Employment Information Service also suggested that personality, attitude (positivity, sincerity, leadership), and core job abilities (problem-solving ability, communication skills, interpersonal relations) were important qualities for new college-graduate employees. [7] Research by the Korea Employers Federation also suggested that important factors affecting employment were personality and affective abilities of job seekers. [8] In summary, the important factors affecting employment were personality and affective abilities of job seekers, while sincerity, positivity, communication skills, interpersonal relations, and problem-solving abilities also ranked high on the list.

Those personality and affective abilities which were found to be important factors affecting employment have many aspects that coincide with the ABEEK accreditation system, which aims to cultivate engineering manpower. For example, the design education of the ABEEK accreditation system boosts creativity, problem-solving ability, communication skills, and leadership through the process of working as a team, coming up with ideas, and finding engineering solutions. Therefore, the abilities developed through the engineering education accreditation overlap considerably with the qualities regarded as important for new recruits by companies. In this study, this was considered to be an important factor in analysing the effects of engineering education accreditation on employment rates in the same field as graduates' majors.

To investigate the effects of engineering education accreditation on employment rates in the same field as graduates' majors, the correlations between employment rate and the engineering education accreditation curricula were analysed for 860 graduates from undergraduate programs of the University of Seoul which operated engineering education accreditation in the years of 2009 - 2013. Specifically, the MSC credits acquired and the design credits acquired were considered to be important elements which differentiated the engineering education accreditation curricula from the general curricula.

Six programs of the University of Seoul introduced ABEEK accreditation after 2006 and turned out the first graduates from six undergraduate programs in February 2010. Environmental engineering and civil engineering programs began ABEEK accreditation during 2007 and 2008, respectively, and produced their first accredited graduates in February 2011 and February 2012, respectively. However, the electrical

engineering program stopped the accreditation in March 2013. Thus, seven programs were operating engineering education accreditation at the University of Seoul as of February 2014. The number of graduates from the seven undergraduate programs with engineering education accreditation at the University of Seoul is shown in Table 1. Although the electrical engineering program produced graduates with accreditation, their data was not included in this analysis because the program hasn't produced accredited graduates since February of 2013. For three and a half years (September 2009 - February 2013), the seven programs produced 330 accredited graduates while 530 graduates were produced from non-accredited programs. Thus, 38.4% of the total graduates were accredited and 61.6% of the total graduates were non-accredited.

Table 1. Numbers of ABEEK accredited and non-accredited graduates at the University of Seoul.

Graduated in	Number of Graduates		
	Accredited	Non-accredited	Subtotal
February 2010	31 (24.8%)	94 (75.2%)	125
August 2010	8 (19.5%)	33 (80.5%)	41
February 2011	63 (35.6%)	114 (64.4%)	177
August 2011	22 (26.2%)	62 (73.8%)	84
February 2012	74 (44.6%)	92 (55.4%)	166
August 2012	47 (40.9%)	68 (59.1%)	115
February 2013	85 (55.9%)	67 (44.1%)	152
Total	330 (38.4%)	530 (61.6%)	860

All freshmen belonged to the seven departments which operate the ABEEK accreditation at the University of Seoul enter to the accredited programs. However, they can transfer freely to the non-accredited programs before becoming senior students at the university. Thus, there was no difference in their initial achievement between the accredited and the non-accredited graduates when they entered the university as freshmen.

The minimum requirements for successful graduation of the accredited and non-accredited students at the University of Seoul include (1) ≥130 credits acquired in total, (2) GPA of ≥2.0 out of 4.5, (3) registration of 8 semesters, and (4) pass of the graduation exam. For the accredited students, the following requirements must be met in addition to the above common requirements: (1) 18 credits acquired in general engineering subjects, (2) 30 credits acquired in MSC subjects, and (3) 18 credits acquired in design subjects (it has been changed to 9-12 credits depending on majors by ABEEK since March 2013). The credits acquired for meeting the requirements of the ABEEK accreditation are also counted as the first minimum requirement, ≥130 credits acquired in total, for all students. It should be noted that the non-accredited students can also meet the first minimum requirement by acquiring credits in the general engineering subjects, MSC subjects, and design credits.

3. Results and Discussion

3.1. Comparison between Accredited and Non-accredited Students

The MSC credits acquired by the graduates employed in the same fields as their majors (hereafter "the same field employed"), acquired by the graduates employed in the different fields with their majors ("the different field employed"), and acquired by the unemployed graduates ("the unemployed") were compared between accredited and non-accredited graduates, as shown in Figure 1. The accredited and non-accredited graduates acquired 30.9 and 18.0 credits on average, respectively. Thus, accredited graduates acquired 12.9 MSC credits more than the non-accredited graduates. All the accredited graduates acquired above 30 credits and there was almost no difference among the three groups. However, the non-accredited same field employed graduates acquired 19.3 credits, which were 3.4-4.6 credits more than the different field employed and the unemployed non-accredited graduates.

For design credits, the accredited and non-accredited graduates acquired 19.9 and 8.5 credits on average, respectively (Figure 2). Thus, the accredited graduates acquired 11.4 design credits more than the non-accredited graduates. All the accredited graduates acquired above 19 credits and there was almost no difference among the three groups. However, the non-accredited same field employed graduates acquired 9.1 credits and 0.7 - 1.8 credits more than the different field employed and the unemployed non-accredited graduates, respectively.

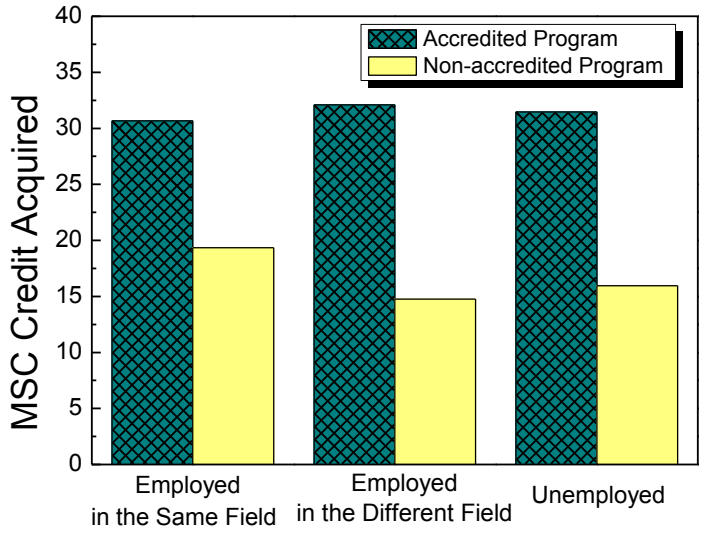

Figure 1. Comparison of MSC credits acquired by the ABEEK accredited and non-accredited graduates.

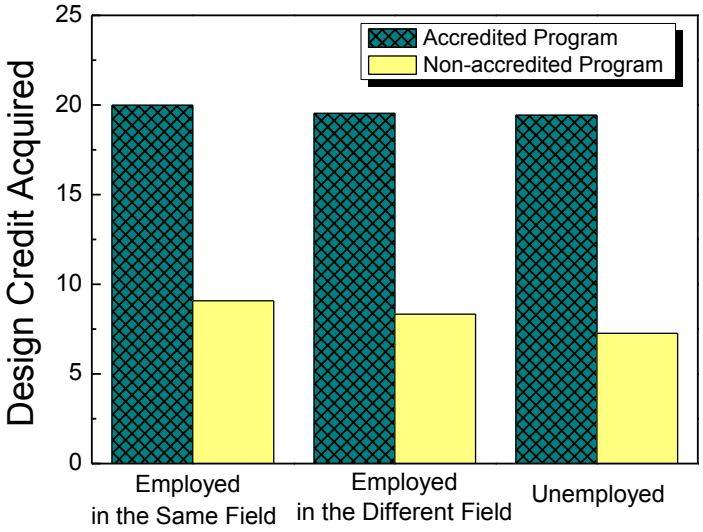

Figure 2. Comparison of design credits acquired by ABEEK accredited and non-accredited graduates.

The GPAs of accredited and non-accredited graduates were compared, as shown in Figure 3. The GPAs of accredited and non-accredited graduates were 3.59 and 3.43 out of 4.5, respectively. Thus, the GPA of accredited graduates was higher by 0.16 points than that of non-accredited graduates. The GPAs of the same field employed, the different field employed, and the unemployed accredited graduates were 3.61,

3.57, and 3.50, respectively. In contrast, the GPAs of the same field employed, the different field employed, and the unemployed non-accredited graduates were 3.49, 3.26, and 3.34, respectively. The GPAs of the same field employed were higher than both the different field employed and the unemployed for both the accredited and non-accredited graduates.

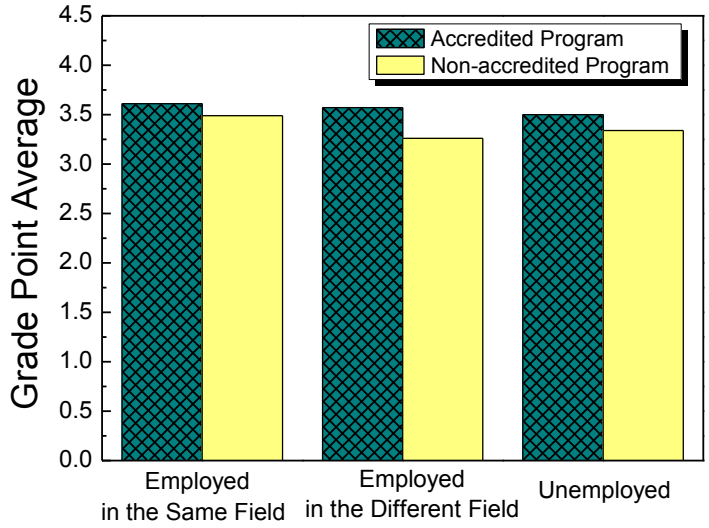

Figure 3. Comparison of the GPA's of accredited and non-accredited graduates.

In summary, the accredited graduates acquired 12.9 MSC credits and 11.4 design credits more than the non-accredited graduates, and the GPA of accredited graduates was higher by 0.16 points out of 4.5 than that of non-accredited graduates. All the accredited graduates acquired above 30 MSC and 19 design credits and there was little difference in those credits acquired among the three groups, i.e., the same field employed, the different field employed, and the unemployed. In contrast, the same field employed non-accredited graduates acquired 3.4 - 4.6 MSC credits and 0.7 - 1.8 design credits more than the other two groups of the non-accredited graduates. GPAs of both the accredited and the non-accredited same field employed graduates were higher than the other groups of both accredited and non-accredited graduates.

3.2. Factors Affecting Employment Rate

The total employment rates for accredited and non-accredited graduates were 82.7% and 70.4%, respectively. When we consider the same field employment rate only, the average employment rates of accredited and non-accredited graduates become 76.7% and 62.5%, respectively. That means that 92.7% of the employed accredited graduates found their jobs in the same fields as their majors. In contrast, 88.7% of the employed non-accredited graduates found their jobs in the same fields as their majors. Thus, the total employment rate of the accredited graduates was higher by 12.3% than that of non-accredited graduates. The difference in the same field employment rate between the accredited and non-accredited graduates grew from 12.3% to 14.2%. This result suggests that the accredited program at the University of Seoul makes a meaningful contribution to help accredited graduates find jobs in the same fields as their majors.

The relationship between MSC credits acquired and the same field employment rate is shown in Figure 4(a). Graduates from the accredited program acquired more MSC credits and showed a higher employment rate than graduates from the non-accredited program. The same trend was also observed in the relationship between design credits acquired and employment rate (Figure 4(b)). The engineering education accreditation curriculum required 30 credits in MSC subjects and 18 credits in design subjects

(changed to 12 credits in design subjects by ABEEK since March 2013) for graduation. The MSC courses allow students to systematically and effectively acquire scientific knowledge through the curriculum. The engineering education accreditation curriculum also requires students to take introductory design - elemental design - capstone design subjects as mandatory courses. Those design education courses cultivate self-directed learning ability, problem-solving ability, team work ability, communication skills, and creativity through the process of searching for creative solutions by team work to the given problems. This engineering education accreditation curriculum is expected to improve academic achievement, i.e., a higher GPA, and the employment competitiveness of graduates.

The research of the Korea Employment Information Service showed that personality and attitude (positivity, sincerity, leadership) and basic job abilities (problem solving ability, communication skills, interpersonal relations) were important factors that influenced successful employment [7]. A previous research [9] suggested that the MSC and design education improves the creativity, problem solving ability, communication skills, interpersonal relations, and leadership through the process of forming a team, coming up with ideas, devising engineering systems, and finding engineering solutions, and that these abilities are beneficial for various employment exams including interviews, resulting in an increase of the employment rate.

Figure 4(c) shows the relationship between GPA and employment rate. Higher GPA of the accredited graduates is associated with higher employment rate. The reason for a higher employment rate of graduates with higher academic achievement (GPA) can be assumed to be that companies give preferential treatment to students with higher GPAs. Also, students who are more diligent in their studies would be advantageous in competing for employment because they have better abilities in their field of study and are better prepared for their career plans.

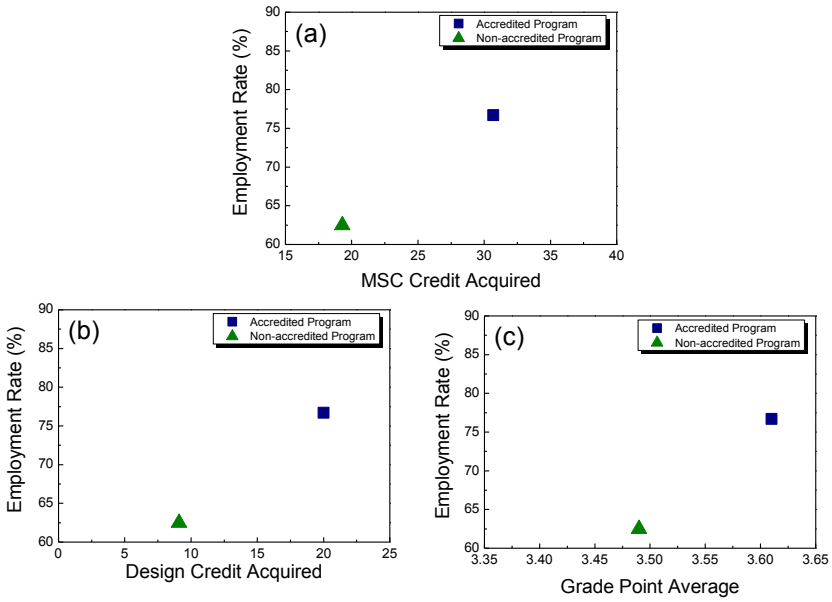

Figure 4. Effects of (a) MSC credits acquired, (b) design credits acquired, and (c) GPA on the same field employment rates of the accredited and non-accredited graduates.

As shown in Figures 1 - 3, the accredited graduates acquired 12.9 MSC credits and 11.4 design credits more than the non-accredited graduates. There was little difference in MSC and design credits acquired among the three groups of accredited graduates, i.e., the same field employed, the different field employed, and the unemployed. In contrast, the same field employed non-accredited graduates acquired 3.4 - 4.6 MSC credits and 0.7 - 1.8 design credits more than the other two groups of non-accredited graduates. These results suggest that the additional MSC and design credits acquired helped non-

accredited graduates to find jobs in the same fields as their majors. The positive influence of MSC and design subjects in finding jobs was discussed in above.

Figure 3 showed that the GPAs of both the accredited and the non-accredited same field employed graduates are higher than the other two groups of both accredited and non-accredited graduates. In turn, both the accredited and non-accredited same field employed graduates acquired more design credits than the other two groups of both accredited and non-accredited graduates (Figure 2). From these results and Fig. 4, we can infer that design education helps both accredited and non-accredited graduates to find jobs in the same fields as their majors.

From Figures 1 - 4, it is clear that a higher employment rate is associated with higher GPA, and higher GPA is associated with both the higher design credits acquired and the higher MSC credits acquired. It was suggested that the design and MSC education improved the creativity, problem solving ability, communication skills, interpersonal relations, and leadership through the process of forming a team, coming up with ideas, devising engineering systems and finding engineering solutions [9], and that these abilities are beneficial for various employment exams, including interviews, resulting in an increase in employment rate. The accredited graduates at the University of Seoul acquired 12.9 more MSC credits and 11.4 more design credits than the non-accredited graduates. Those factors helped develop their attitude (positivity, sincerity, leadership) and basic job abilities (problem solving ability, communication skills, interpersonal relations), resulting in higher employment rate than the non-accredited graduates. This is also supported by the research of the Korea Employment Information Service [7], which showed that personality and attitude (positivity, sincerity, leadership) and basic job abilities (problem solving ability, communication skills, interpersonal relations, etc.) were important factors that influenced successful employment. In summary, the ABEEK accreditation at the University of Seoul helped students develop interpersonal and personal skills such as teamwork, communication skills, and creativity by working in design classes, which affected the employment rate indirectly.

4. Conclusions

Graduates who had been educated in the accredited program showed higher GPAs (3.59/4.50) and higher employment rates (82.7%) than graduates who were educated in non-accredited programs (3.43/4.50, 70.4%). When we consider the same field employment rate only, the average employment rates of accredited and non-accredited graduates were 76.7% and 62.5%, respectively. Thus, the total employment rate of the accredited graduates was higher by 12.3% than that of non-accredited graduates. The difference in the same field employment rate between the accredited and non-accredited graduates increased from 12.3% to 14.2%. It also means that 92.7% and 88.7% of the employed accredited graduates and non-accredited graduates found their jobs in the same fields as their majors.

There was little difference in MSC and design credits acquired among the three groups, i.e., the same field employed, the different field employed, and the unemployed. In contrast, the non-accredited same field employed graduates acquired 3.4 - 4.6 MSC credits and 0.7 - 1.8 design credits more than the other two groups of non-accredited graduates. GPAs of both the the accredited and non-accredited same field employed graduates were higher than the other groups of both accredited and non-accredited graduates. These results suggest that the additional MSC and design credits acquired were beneficial to non-accredited graduates as well as accredited graduates in finding jobs in the same fields as their majors, by helping them to develop interpersonal and personal skills such as teamwork, communication skills, and creativity. This result also suggests that the accredited program at the University of Seoul makes a meaningful contribution to accredited graduates in finding their jobs in the same fields as their majors.

5. Acknowledgements

This work is financially supported by the Ministry of Education (MOE) through the fostering project of the Innovation for Engineering Education (ICEE).

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