

## ***Korean Engineering Professors' Views on English Language Education in Relation to English-Medium Instruction***

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English-medium instruction (EMI) has become an international phenomenon, but studies of engineering professors conducting EMI remain rare. Furthermore, few studies have been conducted on EMI from the perspective of Korean engineering professors. Thus, the faculty at a Korean engineering school that is leading the EMI trend among Korean universities was selected for investigation. A questionnaire survey was conducted for 48 professors in various engineering fields. They were asked how they and their students could be assisted to achieve effective EMI. In addition, statistics on the EMI classes within the school and on the professors' backgrounds related to their ability to conduct EMI were examined. The results demonstrate that even though the majority of the professors believed that many students lacked sufficient English skills to successfully participate in EMI classes, they were reluctant to encourage the expansion of English language teaching (ELT) for students. Moreover, the professors' backgrounds suggested that they themselves were in need of intensive English language training to provide adequate EMI; nevertheless, many professors were not in favor of such training. The professors' critical attitudes toward the school's EMI policy may provide an explanation as to why many had reservations about expanding ELT for students and for themselves.

**Keywords:** Korean engineering professors, English-medium instruction (EMI), Korean English language teaching (ELT)

## INTRODUCTION

Academic institutions across the world have taken initiatives to embed internationalization into their offerings, such as establishing branch campuses, international collaborative programs, programs for international students, and English-medium instruction (EMI) programs, in order to strengthen their competitive power in the global academic environment (Altbach & Knight, 2007). In particular, EMI – English is used as the medium of instruction in locations where English is not the native language of the students – is becoming increasingly prevalent throughout academic institutions worldwide (Carvajal, 2007; Coleman, 2006; Mydans, 2007). In Europe, 46 countries agreed to the Bologna Process in the 2010/11 academic year, and this has fostered students' academic pursuits in universities in other countries. With this trend, English has become the academic lingua franca in European institutions (Doiz, Lasagabaster, & Sierra, 2011). Between 2002 and 2007, the number of EMI programs in higher education institutions increased by 340%, from 700 to 2,400 (Wächter & Maiworm, 2008). European universities provide these EMI programs with goals “to attract international students, to prepare domestic students for the global labour market, and to raise the profile of the institution” (Doiz et al., 2011, p. 347).

In Anglophone Africa, such as East Africa and Southern Africa, most schools use English as the language of instruction rather than their indigenous languages. This education language policy results from the region's multilingual environments where a government's choice of one indigenous language over another may cause conflicts. It also results from the widely accepted belief that the use of English promotes the nation's and its people's economic gains (Kamwangamalu, 2013).

In Asia, the Korean government has aggressively pursued the internationalization of its universities and has included the implementation of EMI as part of its internationalization efforts. In 2004, the Korean government began providing financial support for higher education institutions that adopt EMI policies (Byun & Kim, 2011). Within two years,

the number of EMI classes increased to 2.2%, of the 410,000 university courses available (Byun & Kim, 2011). By 2011, 30% of all classes offered by universities in the Seoul metropolitan area and 10% of those in other areas were EMI classes (Kim, 2011).

In particular, Korean science and technology schools have led the adoption of EMI due to their dependency on the English language in communicating new knowledge and information with their peers around the world. Korea Advanced Institute of Science and Technology (KAIST) and Pohang University of Science and Technology (POSTECH), which are the two most regarded science and technology schools in Korea, have attained the highest rates of EMI classes among Korean universities. In 2006, KAIST adopted an EMI policy for all classes to be conducted in English; by 2010, POSTECH was offering 88% of undergraduate classes and 95% of graduate classes in English (Cho, 2012).

Despite this extraordinary emphasis on EMI, few studies have been conducted on English language teaching (ELT) with respect to EMI from the perspective of Korean engineering professors. The discussions that have been had on the engineering faculty's opinions on ELT and EMI have been part of studies that focused on students in EMI situations rather than the professors. The present study investigates faculty's viewpoints on ELT in the EMI environment at a Korean engineering school and on improvement measures for more effective EMI.

The faculty at KAIST was chosen for the study because the school has been leading the trend of EMI among Korean universities. KAIST was established in 1971 as Korea's first graduate school specializing in science and engineering education and research, with the full support of the Korean government; it was reestablished in 1990 as an institute with both undergraduate and graduate students. KAIST has six colleges – Natural Sciences, Life Science & Bioengineering, Engineering, Information Science & Technology, Liberal Arts & Convergence Science, and Business – and eleven graduate schools, including the Graduate School of Nanoscience & Technology, Medical Science & Engineering, Green Transportation, Culture

Technology, and Information Security. Presently, there are over 600 tenure-track faculty, 402 general staff, and 10,249 students. More than 6,000 students are graduate students, approximately 60% of undergraduate students are graduates of science magnet high schools in Korea; and over 200 students are international students (KAIST, 2013). KAIST is arguably the most reputable science and engineering school in Korea; furthermore, it was ranked third in the Times Higher Education's (THE) 2013 list of the best 100 universities whose histories are 50 years or less (Simon, 2013). Moreover, KAIST was ranked fifth worldwide in the number of international patent applications from a university in 2011 according to the report by the World Intellectual Property Organization (Kim & Park, 2012).

The research questions in this study are as follows:

1. Do Korean engineering professors feel that students have sufficient English language skills for EMI classes?
2. How do the professors think that students can be helped to improve English language ability?
3. How do the professors think that they themselves can be helped for more effective EMI?

## **LITERATURE REVIEW**

### **Theoretical Orientation**

The principle of English-medium instruction (EMI) is to teach content as well as to provide English language training while using English as the medium of instruction. Johnson and Swain (1994) argued that the development of language proficiency is important in late immersion programs. In early immersion programs, where young students at age five or six start receiving intense foreign language instruction, (foreign) language and concepts develop at the same time; however, in late immersion programs,

the language develops after the concepts, so instruction on the language structure is required.

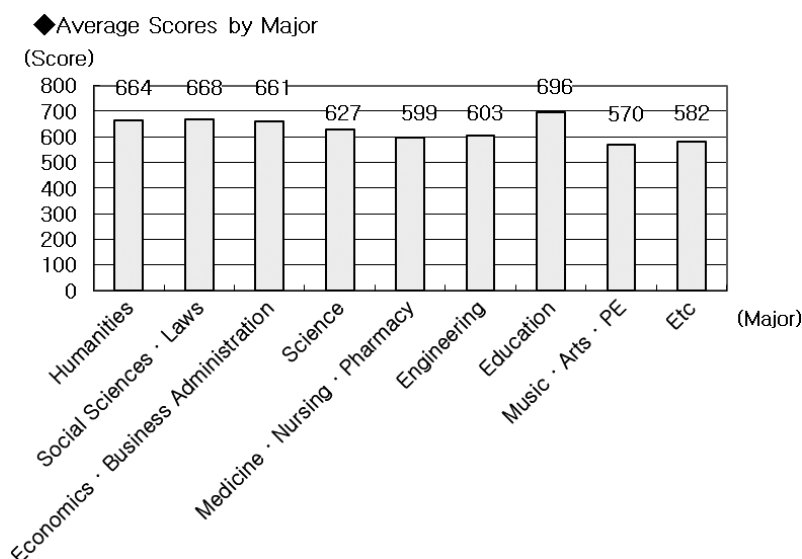
Several studies have proven that students' English fluency is the most critical factor for successful EMI. Marsh, Hau, and Kong (2000) examined the effects of EMI on Chinese students in a Hong Kong high school and concluded that EMI classes that require a higher degree of English proficiency such as geography, history, and science were unfavorable to the students, but students who were fluent in English were less influenced by the negative effects of EMI. The researchers recommended that teaching every subject in English is not desirable and that only students with fluent English skills should be given EMI. Moreover, Kang and Park (2005) confirmed that students' appropriate level of English proficiency is a requirement for the successful implementation of an EMI policy. This was demonstrated through the strong positive correlations between students' English fluency and their understanding of textbooks and lectures and between their English fluency and performance in EMI classes.

### **Korean Engineering Students' English Ability**

As part of the needs analysis for an English course, a questionnaire survey with a five-point Likert scale was conducted with 286 undergraduate students (93 engineering, 123 humanities, and 70 natural science students) and 24 engineering professors at the University of Seoul in September 2009 (Hong & Lee, 2011; Lee & Hong, 2010). The majority of the engineering students had very low English speaking abilities; more specifically, 71 (80.7%) of the 93 engineering students surveyed had been placed in the lowest level of four levels. In addition, their average score on the Test of English for International Communication (TOEIC) was 622.96 out of 990 (990 is comprised of 495 for listening comprehension and 495 for reading comprehension); this was the lowest average score for undergraduate students when compared with those of the humanities students (715.09) and natural science students (634.58). In a self-evaluation, the engineering students evaluated their English language

skills to be lower than those of the humanities and natural science students, except for their listening skills.

This is consistent with the world trend of engineering students having a low English ability according to the statistics presented by the Educational Testing Service (ETS, 2013). In 2012, 2,085,874 people took the TOEIC worldwide, and their average score was 633 (listening = 345; reading = 288). Among the examinees, 64% were students. Those majoring in education obtained the highest average score, 696/990, while the engineering students' average score was 603, lower than those of other majors, including social science and law majors 668 and humanities 664 (Figure 1).



**FIGURE 1**  
**TOEIC Scores 2012 (Educational Testing Service, USA)**

Furthermore, Kang and Park (2004) conducted a questionnaire survey among Korean engineering professors who were teaching classes in English in the fall semester of 2003 at Y University, located in Seoul. Only 10.5% of the professors thought that their students had sufficient English language skills

for EMI classes. Regarding the specific English problems in the EMI classes, 47.4% of the respondents stated that students' insufficient listening ability was the most serious problem, followed by 36.8%, who thought the instructors' insufficient ability to explain in English was most problematic and 31.6%, who said that students' inadequate speaking ability was the most problematic. Regarding the students' level of understanding in the EMI classes, 63.2% of the professors observed that their students sometimes did not understand their lectures, while 36.8% of them felt that they often did not.

In his study of the faculty at Pohang University of Science and Technology (POSTECH), Cho (2009) rated the English writing levels of POSTECH's graduate students to be very low, while 74% of the graduate students reported having had difficulties in writing and publishing papers in English journals.

These studies and statistics reveal that a large number of Korean engineering students do not possess sufficient English skills to function well in EMI classes.

### **Improving Korean Engineering Students' English Ability**

Regarding the measures or suggestions to improve the effectiveness of EMI, in Kang and Park (2004) survey study of 19 engineering professors with experience of teaching EMI classes, the highest percentage of them (42%) thought that EMI classes should be introduced in later years, i.e., for third- or fourth-year students, and 21.1% said for even higher-level students, i.e., graduate students. They additionally suggested that the school should provide a variety of EMI support programs such as undergraduate English writing classes and preparation classes for EMI in major areas. The professors also saw needs for native English-speaking instructors to provide feedback on students' presentations and essays. They were in favor of expanding the EMI classes in major areas, but were against EMI expansion in liberal arts classes. Regarding the school's support for individual professors teaching EMI classes, many preferred that the school reduce the requirements of instructional hours, and 57% of them stated that the school should provide

financial incentives, as teaching an EMI class requires twice the effort of teaching a Korean-medium instruction (KMI) class.

Three questionnaire surveys were conducted with undergraduate engineering students attending K University between the fall of 2004 and the fall of 2005 (Park, 2006). They were asked 1) if the EMI classes were helpful, 2) if so, what the reasons were, and 3) if they would choose EMI over KMI classes given another chance. The results demonstrated that the students were more satisfied with the EMI classes than with the KMI classes that they had taken. However, the first- and second-year students were fearful of the EMI classes. Without background knowledge of the subject being taught, they indicated that they had a difficult time following the EMI classes. Therefore, the researcher recommended that when offering basic required courses related to major areas through EMI, the school should provide special consideration such as sheltered instruction to facilitate student learning. For example, the instructor should focus on explaining one topic for 15 to 20 minutes while frequently checking student comprehension. In addition, in order to maximize the effects of EMI, the researcher suggested offering EMI classes in smaller sizes to facilitate interactions between the instructor and students (Park, 2006).

Kang and Park (2005) administered a web-based survey to 366 engineering students taking EMI courses at a private university in Seoul. The researchers reported that the majority (approximately 80%) of the students who participated in their survey responded that they had seldom or never received feedback on grammatical errors from their instructors. In order for students to improve their English ability through the EMI classes, they must practice their production English skills, e.g., presentation and report writing skills, rather than being passive in EMI classes; in these English production processes, receiving feedback is crucial for development. Therefore, the researchers concluded that it is necessary for the school to take various measures including having professors who can offer English language support available for help with English language-based feedback.

Kang and Park also noted that the surveyed students neither considered the



Korean instructors' English pronunciation or lecture skills problematic nor thought that the EMI courses should be taught by native speakers of English. The authors argued that a possible reason for these attitudes was the Korean professors' use of Korean-English code-mixing in class. That is, when the students had difficulty understanding the class, the Korean instructors provided timely help by alternating English and Korean or paraphrasing in Korean.

Moreover, in her investigation of teaching methods for Korean engineering students with low English levels (TOEIC scores between 200 and 420) in EMI classes at a regional university, B. Lee (2010) reported that most of her student subjects (68.9%) preferred instructors' code-mixing of English and Korean in the EMI classes over English-only instruction. The majority of students (78%) supported the alternate use of English and Korean in different ratios depending on the students' school years, namely, 20:80 in the second year, 30:70 or 40:60 in the third year, and 50:50 in the fourth year. In order to offer EMI classes to engineering students with limited English ability, the researcher suggested that 1) providing fundamental knowledge of both English and major subjects is necessary, 2) English is used with Korean, and 3) the instructor must use the same English sentences used in the textbook in order to help students' understanding of lessons and course materials (B. Lee, 2010).

### **Improving Professors' English Ability**

In a study of professors at a Dutch engineering university, Vinke (1995) observed that instructors whose English skills were not sufficient 1) covered fewer materials when in EMI classes than when they taught in their native tongue 2) had trouble with their English pronunciation, accent, and intonation, and 3) felt that they lacked flexibility in class delivery and humor and interactions with their students.

Vinke, Snippe, and Jochems (1998) examined the effects of instructional language change from Dutch to English on instructors' teaching performance

and behaviors. The subjects were 131 instructors who had experience in conducting both EMI and Dutch-medium instruction (DMI) at three universities of technology, i.e., Delft, Eindhoven and Twente; Wageningen University of Agricultural Sciences; and the departments of economics at other universities. Overall, the study concluded that although only a limited amount of difference was observed in the instructors' teaching performance and behaviors between in DMI and in EMI classes, the instructors in the EMI classes exhibited "limitations in vocabulary, redundancy, and clarity and accuracy of expression; a reduced ability to cope with those aspects of teaching that go beyond the scope of one's preparation; an increased workload in terms of preparation time and (mental) energy; a less favorable view of one's instructional quality; and an increased importance of adequate teaching skills" (Vinke et al., 1998, pp. 391-392). Moreover, the authors observed that the instructors who were successful in switching from DMI to EMI were those who were more experienced in teaching in general and in teaching EMI classes specifically; who were more fluent in English; who had more opportunities to use English in their profession, such as speaking English in their job-related tasks, participating in conferences where English is the medium of communication, and reading professional literature in English; and who had spent two months or more in an English-speaking country.

Given these findings, the authors made several recommendations for the institutions to implement EMI policies. First, the school should encourage faculty members who have a good command of English, particularly those with high degrees of linguistic flexibility and accuracy, to take part in EMI courses. Instructors who lack sufficient English skills should be required to participate in English training before conducting EMI classes. Second, instructors with many years of experience in the classroom, preferably in EMI classrooms, should be encouraged to teach EMI courses. Third, the school should exempt EMI instructors from part of their responsibilities in order that they can secure time to prepare themselves for their EMI courses. Fourth, the school should create an environment where instructors can

practice English regularly.

In Korean universities, most faculty members are Korean nationals: according to the Joongang Daily, the three Korean universities with the highest percentages of full-time foreign professors in 2013 are Hansei University (39%), Busan University of Foreign Studies (33%), and Hankuk University of Foreign Studies (31%) (Editorial Office, 2013). This demonstrates that more than 70% of the faculty population in the majority of Korean universities consists of Korean nationals. As many Korean students lack sufficient English skills to function well in EMI classes, their professors have an additional burden to teach difficult major subjects in English that the students will understand. In fact, the results of a questionnaire survey conducted in the engineering school at Y University with the 24 professors teaching major courses in English in November 2003 demonstrate that the majority (84.2%) of them felt stressed by teaching classes in English, and 57.9% felt as much as twice or three times more burdened by EMI than by KMI (Kang & Park, 2004).

In providing assistance to engineering professors teaching EMI classes, team-teaching with a member of the English faculty may be effective: the engineering instructor may enlist assistance in developing the objectives and assignments of English writing, in his or her instructional delivery in English, and in the evaluation of students' written work (Reave, 2004). Furthermore, Kang and Park (2005) recommended the provision of training in English teaching methods for content-area instructors via workshops and seminars. They concluded, however, that students' English proficiency was the most critical factor for successful EMI classes; thus, assisting students to achieve threshold-level English fluency should be attempted before spreading EMI further among Korean universities.

## **METHODS**

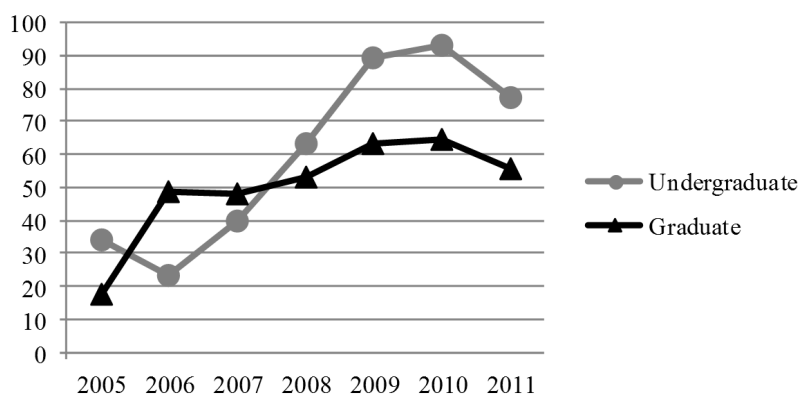
A questionnaire survey was conducted in order to obtain the engineering faculty's views of ELT and English language services offered by the school for more effective EMI. More specifically, professors were asked about their students' English ability, their opinions on the existing English courses and new English courses to be added, and their possible collaboration with English faculty and suggestions for improving the ELT in relation to EMI (see Appendix). The questionnaire was sent to all 18 departments at the school via intra-campus mail between April 15 and 29, 2010. Each department chair was asked to distribute the questionnaire to five of his or her faculty members. Forty-eight professors (8.7% of the 553 full-time professors in 2010) from 13 of the 18 departments (72% of all the departments) sent responses via intra-campus mail or email between in April 20 and May 11, 2010. In addition, statistics on the EMI classes at the school and on the faculty's background related to their ability to conduct EMI were examined.

## **FINDINGS**

### **Do Professors Feel that Students Have Sufficient English Skills for EMI Classes?**

Amid the faculty's and students' criticisms, impelled by the president at that time who had been hired from the USA, the school administration adopted an English-medium policy in 2007 with goals to realize a bilingual (English-Korean) campus that provides an optimal educational environment for international students and to strengthen Korean students' global competitiveness (KAIST, 2008). The following figure demonstrates that 77% of undergraduate classes and 56% of graduate classes for graduate students were conducted in English in 2011. Among Korean universities, KAIST has

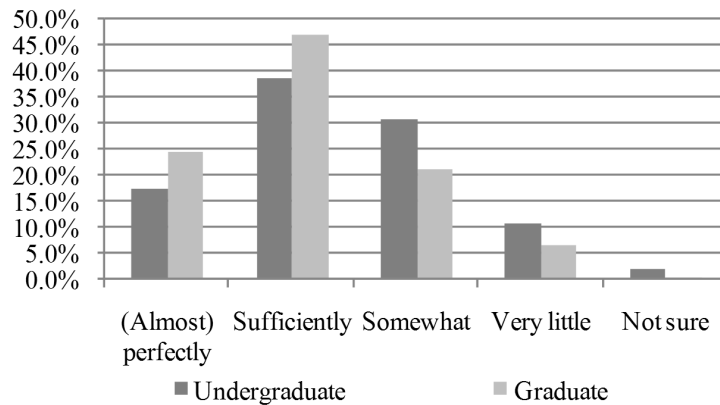
one of the highest percentages of classes delivered in English; the percentages of English-medium classes at other universities are 30% or lower ( Lee, 2011).



**FIGURE 2**  
**English-Medium Classes at KAIST**  
**Academic Registrar's Team, KAIST, March 2012**

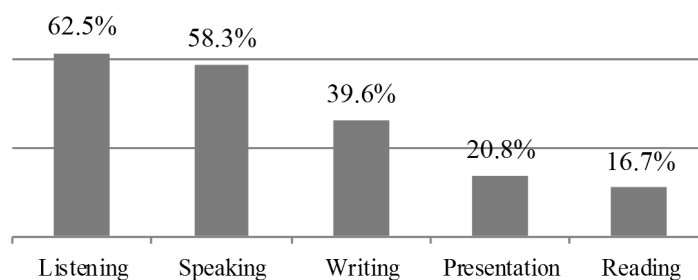
Despite its strong emphasis on EMI, however, the school has kept little data that demonstrates students' actual English ability. While the undergraduate admission office does not require English proficiency scores from applicants, most graduate applicants (68.7% or 2,378 out of 3,463 applicants in 2011) submit English proficiency test scores that measure reading and listening skills only. Only a small number of graduate students (4.8% or 167 out of 3,463 in 2011) submit their results of tests that assess all four English skills, such as the Test of English as a Foreign Language (TOEFL) and the International English Language Testing System (IELTS). Furthermore, after admission, graduate students are not required to have their English skills evaluated, whereas undergraduate students were required to take a standardized English test for the first time in the spring of 2013. Thus, the school does not have data that presents accurate English levels of its students at both graduate and undergraduate levels.

In this survey, the participating professors responded that their students exhibited a wide discrepancy in their English ability, with extremes from very little understanding to full understanding of their EMI classes. The professors speculated that, on average, over 40% of undergraduate students and approximately 28% of graduate students did not possess sufficient English proficiency to successfully participate in EMI classes (Figure 3).



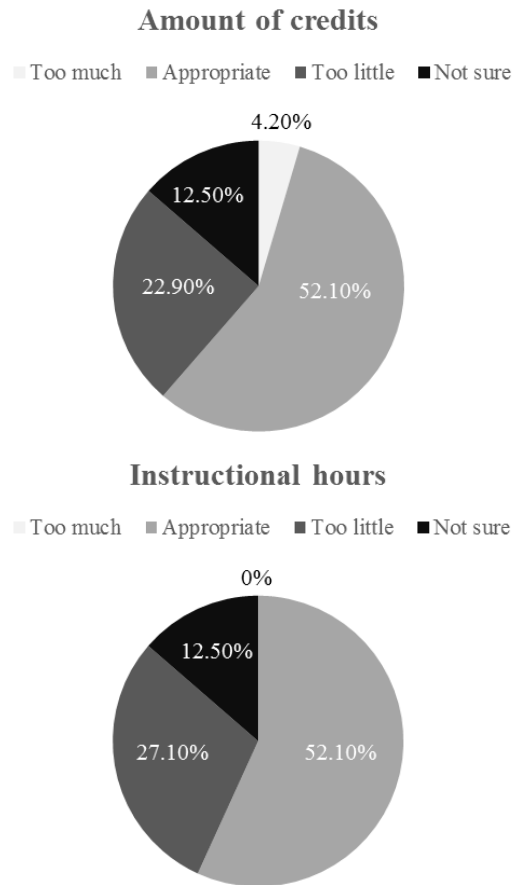
**FIGURE 3**  
**To What Extent Do You Feel that Your Students Understand the Classes that You Conduct in English?**

In addition, the respondents nominated listening and speaking as the skills that undergraduate students needed to improve most urgently while identifying reading to be the least problematic skill (Figure 4).



**FIGURE 4**  
**(Undergraduate) Which English Skills Do You Feel that Your Students**  
**Need to Improve Most Urgently in order to Function well in EMI**  
**Classes? (Multiple Choice)**

Although many professors considered that their students' English abilities were not sufficient for EMI classes, they exhibited contradictory attitudes toward the amount of English language teaching (ELT) that should be provided. With regard to the undergraduate English course requirement of seven hours per week, 52.1% of the respondents said that it was appropriate, whereas only 22.9% said that it was too little, which implies that the majority of them saw little need to expand ELT. Regarding the number of required English credits, the professors' responses had similar tendencies: more than 50% of them considered the current number of credits to be appropriate (Figure 5). This demonstrates that the majority of the professors were satisfied with the extent of ELT being offered to undergraduate students. This is surprising because they had expressed that more than 40% of undergraduate students did not possess sufficient English proficiency for EMI. It would have been more consistent if the professors had preferred to strengthen the amount of ELT provided to the students.



**FIGURE 5**  
**(Undergraduate) How Do You Feel about the 3 Credits Required for English Courses?**

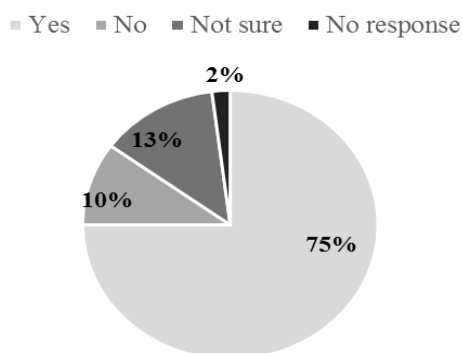
**How Do Professors Think that Students Can Be Helped to Improve Their English Ability?**

In brief, while the majority of the respondents provided a range of



suggestions to strengthen ELT despite their reservations about expanding it, several maintained their criticisms of the school's mandatory EMI policy.

Among the various suggestions made by the respondents for improving ELT, the majority (75%) stated that Scientific Writing, which was the only graduate English writing course being offered by the EFL program at the time of the survey, should be a requirement for graduation (Figure 6). As KAIST is an established research institution, professors' keen interest in improving their students' writing skills appears natural.



**FIGURE 6**  
**(Graduate) Do You Feel a Scientific Writing Should be a Required Course for All Graduate Students?**

The respondents also thought that more graduate courses should be offered in areas of writing, presentation, and speaking. These were also expected responses as there had been only one EFL course at the graduate level at the time of the survey. For undergraduate students, they suggested that additional courses be offered for speaking, writing, and listening, in that order. That is, the professors recognized writing to be the most urgently needed English language skill for graduate students in contrast to speaking skills for undergraduate students.

Earlier, the professors responded that the current amount of ELT was appropriate despite their acknowledgement of students' insufficient English

skills. However, in this section, most professors indicated that additional English language courses should be offered. These responses are certainly contradictory. One possible reason is that both professors and students at KAIST have stringent curriculums that are already at capacity with large numbers of courses. Under these circumstances, the professors may have considered that there was little space for additional English courses in their curriculums although they may have seen the need to enhance ELT for the students. However, this is speculation, and the incongruity warrants a more thorough investigation.

Moreover, 37.5% of the respondents preferred the duration of undergraduate ELT to remain one year, which is the same time frame as the current ELT, whereas 35.4% of them favored the expansion of ELT (two years: 22.9%; three to four years: 12.5%). This indicates that slightly more professors wanted to see little change in the current ELT framework.

Several professors also expressed concerns over the school's EMI policy: one noted, "Instructors themselves are having difficulty with English-medium instruction. In such a situation, even if students' English ability improves, problems with EMI won't go away.... A university is not a place for English language education....If the school wants globalization, it must offer classes in both Korean and English so that students can choose," and another professor stated, "...I strongly believe that humanities and social sciences classes should be taught in Korean because students need to learn their own language before they learn English."

Regarding the improvement of graduate ELT, the professors responded with suggestions similar to those for the undergraduate education. They mentioned the need to strengthen students' writing and speaking skills, including discussion and presentation. A few also recommended offering remedial English classes for students with low English proficiency. Several professors expressed negative opinions about EMI classes at the graduate level as well. Other suggestions included a stricter screening process to be implemented in admissions to filter applicants with insufficient English proficiency.

With respect to extracurricular services to improve students' English skills, the professors' suggestions included enhancing writing assistance services, through a writing center that offers editing and proofreading services and through the Internet, and improving speaking assistance services, such as group or one-on-one English discussion sessions.

### **How Do Professors Think that They Can be Helped for More Effective EMI?**

Although the KAIST professors' backgrounds suggest that they are in need of intensive English training to provide effective EMI, many were not in favor of such training. The majority of the professors (92.5%) at KAIST are Korean nationals (Table 1). In addition, over 27% have received their doctoral degrees from institutions in non-English-speaking countries (as of March 2012). Even if one received his or her doctoral degree from an English-medium institution, his or her English lecturing skills are likely to require intensive training before being able to conduct EMI effectively.

**TABLE 1**  
**Nationalities of the Full-time Professors at KAIST (as of 2012)**

Country of Origin	Number
Canada	2
China	2
France	1
Germany	3
Israel	1
Japan	1
Korea	553
Norway	1
Senegal	1
Turkey	2
U.K.	3
U.S.	28
Total	598

However, many respondents did not feel that they had a strong need for English training: 35.4% said they were not sure, 33.3% did not see a need, and only 27.1% thought that such training should be expanded.

This negative response regarding faculty English programs was unexpected. However, several respondents' comments may explain this reluctance:

- “It will be difficult to require professors to participate in special English classes or training. Unless such classes or training is required, professors won't participate. Everyone is so busy”;
- “I think it is kind of too late to offer English programs and improve the English skills of the faculty after they are hired. It would be better off to hire somebody who has comfortable level of mastering of English [*sic*]”;
- “Senior professors with poor English....We should find a different way to take full advantage of their expertise. No need to insist on communication via English [*sic*]”;
- “Faculty English program is not good idea. Instead, foreign professor's Korean language courses should be required [*sic*].”

These comments demonstrate that professors are not in favor of English training due to their busy schedules, lack of guaranteed positive outcome, and emphasis on Korean rather than English.

Regarding the English training provisions for the faculty, the respondents preferred English classroom idioms and expressions (18.8%), presentation skills (16.7%), and pronunciation (8.3%) as ELT-training topics. They also favored programs with the shortest duration, i.e., a one-day session, during the summer vacation. Indeed, professors intended or wished to invest the shortest time possible in their English language training.

The professors' additional suggestions for faculty English training included providing assistance to the faculty with editing student work and proofreading, offering Internet-based help as well as individual help, and

establishing an English assistance center for the faculty.

With respect to the prospect for collaboration between the English faculty and the engineering faculty for a potentially more effective graduate English program, 37.5% responded positively, while 29.2% rejected the idea. More than 27% of them expressed uncertainty. In other words, the majority of the respondents (56.2%) did not see the benefits of working with the English faculty. Therefore, this warrants further investigation as such collaborations could be effective and beneficial for both groups in conducting EMI classes.

## **DISCUSSION AND CONCLUSION**

### **Students' English Ability and EMI**

According to Johnson and Swain (1994), late immersion students are not able to use a second language as freely as their native language in the way that early immersion students can. Thus, for successful immersion programs, late immersion students must be given opportunities to develop their language skills, and pedagogical approaches for them, e.g., focusing on the language structure, must be different from those for early immersion students.

Worldwide, engineering students have been shown to have lower English abilities compared with students of other major areas including humanities, social sciences, business administration, and education (ETS, 2013). This trend is also observable in Korean tertiary settings. Hong and Lee (2011), for example, demonstrated that engineering students at a Korean university achieved the lowest TOEIC scores compared with those of humanities and natural sciences students. Kang and Park (2004) also demonstrated in their survey study of Korean engineering professors that approximately 90% of the professors felt that the engineering students that they taught had insufficient English skills to successfully function in EMI classes. The highest number of respondents thought that students' insufficient listening ability was the most troublesome language problem in EMI classes.

The participants in the present study too highlighted the problem of students' insufficient English ability for EMI. Regarding the extent that the students understand classes conducted in English, the professors surveyed in this study regarded over 40% of undergraduate students and 28% of graduate students to be ill equipped for EMI classes. Despite students' insufficient English abilities and its mandatory EMI policy, however, the school has not taken appropriate measures to develop students' English proficiency. That is, the undergraduate ELT consists of two required courses and the graduate ELT, only one writing course. For successful EMI, the school must focus on developing and improving its students' English skills first and foremost.

In order to provide an effective English support program, a system to measure students' English levels accurately and efficiently must be in place. Among other measures to consider for the successful implementation of an EMI policy, EMI could be introduced to students in the later years at university, i.e., third or fourth year in undergraduate studies or in graduate studies, after they acquire the fundamental knowledge of their major areas. In addition, instructors may use different, effective pedagogical methods for late immersion students such as code-mixing between their students' native language and English in order to promote students' understanding in class. Also, in order to help enhance students' language skills, the instructors may provide feedback on students' English problems in their oral or written work with the help of English professors.

### **Professors' English Ability and EMI**

International scholars and educators in Korean higher-education institutions comprise less than 30% of the faculty population in most cases. As the majority of the university faculty is comprised of Korean nationals, they are exposed to the dual difficulties of language problems and lack of English lecturing techniques in EMI classes. At KAIST, 92.5% of the faculty is Korean, and most suffer from these dual difficulties.

The results of the present study and the review of other studies have

revealed that several methods can lessen the problem of dual difficulties. First, instead of implementing a mandatory EMI policy and requiring faculty members to conduct EMI classes indiscriminately, professors who are proficient in the English language should be encouraged to offer EMI classes with additional incentives such as reduced teaching requirements and extra financial benefits. Also, the faculty teaching in the major area may benefit from collaboration with English faculty in the EMI classroom because they may be able to obtain support from the English language experts in any or all stages of instructional design, delivery, and evaluation.

Furthermore, as it is challenging for Korean engineering schools to recruit faculty with both a good command of English and an outstanding scholastic background, it is necessary to establish an English language support center for the faculty, where faculty can participate in systematic English training. This proposed center could offer a variety of English assistance programs, such as speaking/writing clinics, proofreading/editing services, and writing classes and workshops. The academic staff at the center may also engage in long-term research of effective EMI in the context of Korean engineering schools.

As with ELT for students, the faculty presented negative opinions about their own English training even though their background certainly requires it for more effective EMI. The professors' comments such as their busy schedules may provide some reasons for lack of enthusiasm, but this issue requires a more thorough investigation.

### **Fundamental Issues in EMI**

The research goal of this study was to investigate what could or should be done in order to improve ELT for effective EMI from the perspective of Korean engineering professors. However, several participants raised more fundamental issues and questioned the adequacy of EMI itself. Their critical attitudes toward the school's EMI policy may explain why many survey participants were reluctant to consider the expansion of ELT for students and

for themselves. Although most professors acknowledged the problem of students' insufficient English proficiency, the majority stated that they were satisfied with the current level of ELT, while simultaneously arguing for additional English courses. This stark contradiction may be a manifestation of their conflicting opinions about the EMI policy. Future studies should explore this important issue to determine the necessity and validity of EMI courses in the context of Korean engineering schools.

In fact, in the spring of 2011, four undergraduate students at the school committed suicide, and this shocked the nation as this happened to the brightest students attending the most prominent engineering school in Korea (J. Lee, 2011; Lim, 2011). The school's mandatory EMI policy was blamed as a possible cause for such tragic losses because many believed that it added a higher level of stress to the highly competitive students who had already been stressed by the school's stringent academic demands and whose English skills were not sufficient for the EMI classroom (Editorial, 2011; McDonald, 2011). Consequently, the school, or the school president at the time who had been adamant about the EMI policy, abandoned the mandatory EMI policy in the fall of 2011 and has since allowed courses to be taught in either Korean or English.

These concerns about EMI in Korean universities have been reiterated in other studies. Byun et al. (2011), for instance, reported that there were increasing concerns at Korea University that EMI may have functioned as an impediment to students' learning and suggested that the issue be carefully examined by policy makers and researchers. The authors cautioned against the hasty expansion of EMI in Korean academic institutions.

Future studies, therefore, should be directed toward investigating more fundamental issues related to EMI in the context of Korean engineering schools, that is, if EMI is necessary for Korean engineering students, if so, how to build consensus among the faculty and the students in implementing it, and what the effective EMI and ELT approaches are for both the students and the instructors to function well in EMI classes.



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## APPENDIX

### Faculty Questionnaire on English Language Programs and Services

#### Undergraduate Program

1. To what extent do you feel your students understand the classes that you conduct in English?

\_\_\_\_\_ % understand (almost) perfectly  
\_\_\_\_\_ % understand sufficiently  
\_\_\_\_\_ % understand somewhat  
\_\_\_\_\_ % understand very little  
\_\_\_\_\_ Not sure

2. Which English skills do you feel that your students need to improve most urgently in order to function well in your classes taught in English?

Check all that are applicable.

\_\_\_\_\_ Writing    \_\_\_\_\_ Reading    \_\_\_\_\_ Speaking  
\_\_\_\_\_ Listening    \_\_\_\_\_ Presentation  
\_\_\_\_\_ Other (specify)

\_\_\_\_\_  
\_\_\_\_\_

3. Currently, the school KAIST requires 3 credits/7 instructional hours of English courses.

A. How do you feel about the amount of awarded academic credits?

\_\_\_\_\_ Too much    \_\_\_\_\_ Appropriate    \_\_\_\_\_ Too little  
\_\_\_\_\_ Not sure

B. How do you feel about the amount of required instructional hours?

\_\_\_\_\_ Too much    \_\_\_\_\_ Appropriate    \_\_\_\_\_ Too little  
\_\_\_\_\_ Not sure

4. How do you feel about the overall quality of the English courses offered by the EFL Program?

Highly dissatisfactory	Dissatisfactory	Neutral	Satisfactory	Highly satisfactory
1	2	3	4	5

\_\_\_\_\_ Not sure

5. Which additional courses do you feel the EFL program should offer?

Check all that are applicable.

\_\_\_\_\_ Speaking    \_\_\_\_\_ Listening    \_\_\_\_\_ Writing  
 \_\_\_\_\_ Reading    \_\_\_\_\_ Presentation    \_\_\_\_\_ Pronunciation  
 \_\_\_\_\_ Other (specify)

\_\_\_\_\_  
 \_\_\_\_\_

6. How many semesters or years of required courses do you feel would be useful?

\_\_\_\_\_ 1 semester    \_\_\_\_\_ 2 semesters    \_\_\_\_\_ 2 years  
 \_\_\_\_\_ 3 years    \_\_\_\_\_ 4 years

7. What would you suggest to improve the undergraduate EFL program?

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Graduate Program**

8. To what extent do you feel your graduate students understand the classes that you conduct in English?

\_\_\_\_\_ % understand (almost) perfectly  
 \_\_\_\_\_ % understand sufficiently

% understand somewhat  
 % understand very little  
 Not sure

9. Currently the EFL program offers a graduate writing course entitled Scientific Writing as a common core course. How do you feel about the quality of this course?

Highly dissatisfactory	Dissatisfactory	Neutral	Satisfactory	Highly satisfactory
1	2	3	4	5

Not sure

10. Do you feel that Scientific Writing should be a required course for all graduate students?

Yes       No       Not sure

11. Which writing skills do you feel that your students need most urgently?

Thesis writing skills\*       Technical writing skills\*  
 Both       Other (specify)

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\* Thesis writing skills are for writing theses/dissertations/journal articles.

\*\* Technical writing skills are for writing technical documents such as proposals, reports, manuals, and memos.

12. Which additional courses do you feel the EFL program should offer for graduate students? Check all that are applicable.

Speaking       Presentation  
 Pronunciation  
 General Writing (as a prerequisite to Scientific Writing)  
 Other (specify)

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13. Do you feel that the EFL program and each department should work together in order to develop graduate English programs that are suitable/tailor-made for each department

Yes       No       Not sure

14. What would you suggest to improve the graduate English program?

\_\_\_\_\_

#### **English Clinic**

15. Are you aware that an English service program called the English Clinic is being offered to help students with their individual English problems? Through the English Clinic, students can register for up to two half-hour sessions per week with a foreign English professor to get help with their speaking, writing and other English problems.

Yes       No

16. Would you encourage your students to use the English Clinic?

Yes       No       Not sure

17. What other services should be offered to students to improve their English skills?

\_\_\_\_\_

#### **Faculty Program**

18. If the EFL program were to offer faculty workshops in collaboration with the Language Center, which types of workshop should be offered to help professors improve their English skills? Check all that are applicable.

Pronunciation  
 Classroom English idioms & expressions  
 Presentation skills



- Thesis writing skills
  - Technical writing skills
  - Other (specify)
- 

19. A. Do you feel that KAIST should expand the English program (through seminars or workshops) for the faculty?

- Yes       No       Not sure

B. If you answered yes to Question 19, which skills do you feel you need to improve most urgently? Check all that are applicable.

- Pronunciation
  - Classroom English idioms & expressions
  - Presentation skills
  - Thesis writing skills
  - Technical writing skills
  - Other (specify)
- 

20. A. If an English program were to be offered for the faculty, how long would you prefer the program to be?

- One day session
- Sessions for  One week       One month
- One semester       One year
- Other (specify)
- 

B. When should it be offered? Check all that are applicable.

- During weekdays       On Saturdays
  - In summer vacation       In winter vacation
  - Other (specify)
-

Korean Engineering Professors' Views on English Language Education in Relation...

21. Share any suggestions for faculty English programs.

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