English-medium instruction for subject courses in tertiary education: Reactions from Taiwanese undergraduate students

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Abstract

This paper reports part of the results of a research project, the main goal of which is to evaluate the implementation of English as the medium of instruction (EMI) for content courses at a private university in northern Taiwan. The perspectives of both students and teachers were examined in the project. This paper, however, reports mainly the results obtained from the students in terms of the following four aspects: students' reactions to the EMI subject courses, influence of English-medium instruction on the students, difficulties that students encountered in their EMI courses, and their English language learning needs observed during the research process.

The subjects in this study include 370 undergraduate students and six professors from six departments in the three major colleges at the university investigated. Research methods used to collect data include pilot interviews with students, student questionnaire, and face-to-face interviews with professors teaching EMI subject courses. The results reveal that overall, although the students in this study generally did not think that they had a high level of comprehension of their EMI lectures, most of them did not show negative attitudes towards the courses. Moreover, most of the students surveyed agreed that English instruction helped them improve their English language proficiency, especially in terms of listening.

Key words: English for Academic Purposes (EAP), English-medium instruction (EMI) for subject courses, EAP needs analysis, EAP course design

1. Introduction

Despite the unceasing global debates on English as the international lingua França or as "killer language" (Coleman, 2006, p. 1), the adoption of English as the medium of instruction (EMI) has been sweeping across the higher education landscape worldwide (Coetzee, 2004; Coleman, 2006; Crystal, 2004; Flowerdew, 1994; Graddol, 1997; Kirkgöz, 2005; Kurtán, 2004). More than ten years ago, Graddol (1997) had already pointed out that "one of the most significant educational trends world-wide is the teaching of a growing number of courses in universities through the medium of English" (p. 45).

While comprehensive statistical data are still lacking, there is universal recognition of an accelerating trend towards English-medium instruction in higher education[1] (Coleman, 2006). A concomitant outcome is that the number of tertiary-level students studying their subject courses through the medium of English as a second/foreign language continues to increase (Coleman, 2006; Crawford Camiciottoli, 2004; Evans & Green, 2007; Flowerdew, 1994; Fortanet & Bellés, 2005).

Given the many obvious and predictable problems that might be caused by English-medium instruction[2], one may wonder why higher education decision makers still opt for such a policy. Certainly, this trend of Englishization of higher education is inseparable from globalization (Brumfit, 2004; Gardt & Hüppauf, 2004; Graddol, 1997). Apart from this background influence, Coleman (2006, pp. 4-6) further listed seven reasons for the implementation of this policy in Europe: (1) academic internationalization, (2) student exchanges, (3) teaching and research materials available[3], (4) staff mobility, (5) graduate employability, (6) the market in international students, and (7) European CLIL (Content and Language Integrated Learning)[4]. Among these reasons, academic internationalization and CLIL might be the most relevant in the Taiwanese context.

When discussing the trend of academic internationalization, Coleman (2006, p. 5)

had the following comments:

> *Virtually all HEIs [Higher Education Institutions] recognize the imperative of internationalization, and its potential impact on modernization, on* ***the quality of the student learning experience****, on raising the cultural awareness, perspectives and skills of indigenous academic staff and students, on the* ***attractiveness of an institution to*** *staff and* ***students both local and global****, and on profile and prestige. (Bold-faced emphases my own)*

As a keen member of the global village, Taiwan has also been under tremendous pressure from this trend towards academic internationalization. In the last decade, higher education in Taiwan has undergone a period of remarkable change and growth. Various new policies and initiatives have been promoted and implemented to reform higher education. Among them are the government projects "Aiming for the Top University and Elite Research Center Development Plan" and "Teaching & Learning Excellence" which have provoked the most intense competition among local universities. To be awarded funding from these two projects, "academic internationalization" is listed as one of the evaluation criteria. As in many non-native English speaking countries, this emphasis on "academic internationalization" is directly linked to introduction of English-medium instruction in higher education (c.f., Coleman, 2006). Additionally, with the decline in birth rate, local universities are facing difficulties in recruiting domestic students, and they are thus forced to compete against universities from other countries in the international student market. In order to attract both local and international students, an increasing number of Taiwanese universities have in recent years started to offer or have increased the number of EMI subject courses (Chen, 2010; Huang, 2005).

Another major driving force behind this English-medium instruction policy is a common belief that teaching subject courses in English can promote students' interest and motivation in learning the English language, and hence improve their proficiency, while at the same time facilitating their academic performance and increasing their

competitiveness in the job market. This common belief might stem from research in the traditions of North American content-based instruction (CBI) and European CLIL.

In a review of about 30 studies on CBI at tertiary level (mostly quasi-experimental or descriptive in nature), Dupuy (2000, p. 215) concluded:

> *In sum, there is evidence that CBI has a worthwhile "payoff" for students* ***at all levels*** *and* ***in a variety of acquisition contexts, including the university****. This "payoff" encompasses three broad areas: (1) enhanced foreign language competence; (2) enhanced subject matter knowledge; (3) enhanced self-confidence in their ability to comprehend and use the target language; and (4) enhanced motivation to continue foreign language study beyond the requirement. (Bold-faced emphases my own)*

Similarly, Coleman (2006, p. 5) also stated that the many dynamic European CLIL projects seek to achieve "the double benefit of subject knowledge and improved target language proficiency."

However, the above positive results were all based on well-designed experiments or selected individual courses, rather than based on large-scale surveys of regular subject courses taught in English in real university settings. Given that there often exists a gap between the careful design of a policy and its implementation in real classrooms (c.f. Evans, 2009), we cannot be so certain that English-medium instruction can really bring the aforementioned "payoffs" to tertiary students studying their subject courses in a variety of acquisition contexts. In fact, negative results were reported in one large-scale survey[5] conducted in Hong Kong on how language of instruction (English compared with Chinese) influences secondary students' academic self-concept and academic achievement (Marsh, Hau, & Kong, 2002).

Unfortunately, until now, not only does there exist no comprehensive and reliable survey of the implementation of English-medium instruction at the tertiary level in different parts of the world (Coleman, 2006), there appear to be also very few large-scale surveys on the effectiveness of such instruction. However, in the literature

of English for Academic Purposes (EAP), we can easily find studies on various aspects of academic English lectures: for example, (1) on socio-cultural aspects of academic English lectures in EFL contexts (e.g., Balla & Pennington, 1996; Flowerdew & Miller, 1995, 1996; Miller, 2002); (2) on various discoursal features of academic English lectures given by native and non-native English speaking lecturers (e.g., Biber *et al.*, 2004; Csomay, 2002, 2006; Crawford Camiciottoli, 2005; Fortanet & Bellés, 2005; Griffiths & Beretta, 1991); (3) on how the use of different discoursal features influences non-native English-speaking students' lecture comprehension (e.g., Chaudron & Richards, 1986; DeCarrico & Nattinger, 1988; Flowerdew & Tauroza, 1995; Khuwaileh, 1999); (4) on various other factors affecting second language lecture comprehension (e.g., Chiang & Dunkel, 1992); (5) on note-taking and lecture comprehension (e.g., Badger *et al.*, 2001; Clerehan, 1995); and (6) on strategies to improve students' lecture comprehension and participation (e.g., Flowerdew & Miller, 1997; Morell, 2007).

The above list seems to suggest that the majority of EAP scholars seem to hold a position of pragmatic conformism, remaining largely uncritical of the implementation of this English-medium instruction policy. The few available studies on English-medium instruction focused mostly on students' perceptions, problems and strategies in courses taught in English (e.g., Evans & Green, 2007; Flowerdew & Miller, 1992, 1995, 1996; Flowerdew, Miller, & Li, 2000; Hyland, 1997; Kırkgöz, 2005; Littlewood & Liu, 1996). Very few EAP studies have been conducted to investigate the effectiveness of English-medium instruction of content courses in EFL contexts, not to mention large-scale surveys. In Hong Kong, Flowerdew and Miller (1992) studied undergraduate students' perceptions, problems, and strategies in English as a second language lecture comprehension. Although they did briefly discuss their subjects' self-reported comprehension level of the lecture, their study is small in scale – only 30 undergraduate students in a BA TESL methods course.

In Taiwan, Huang & Chung (2000) examined factors affecting students' performance in EMI subject courses, targeting only on a class of 48 seniors (from different departments) taking a course entitled "global business." Hsieh and Kang

(2007) was, to my knowledge, one of the only two studies that looked at the effectiveness and influences of English-instruction for subject courses in Taiwanese universities. In their study, a Civil Engineering professor taught the same course (Civil Engineering Graphics) in two different semesters to two different groups of undergraduate students at National Taiwan University. One group (N= 47) received instruction in Mandarin; the other group (N=19) had the same course taught in English in the following semester. Their results showed that in terms of grades obtained, there was no obvious difference. Nevertheless, students receiving English-medium instruction tended to show a more positive learning attitude, and they also felt that their proficiency in English for the four skills had been improved. Similar results were also found in Wu's (2006) study of the reactions towards English-medium instruction from 28 engineering graduate students at Chung Hua University. The results of his study showed that most students, even those who confessed that they did not have a good command of English, thought that English-medium instruction helped them improve their English proficiency (p. 67). Nonetheless, disadvantages of EMI were also reported by his student subjects: English-medium instruction caused greater difficulties in understanding the course content and inhibited them from expressing themselves fluently in the class. Although Hsieh and Kang (2007) and Wu (2006) reported similar results in their studies, their studies are, again, small in scale.

It thus remains unclear whether English-medium instruction policy effectively improves students' proficiency in English, or conversely, whether it impedes students' learning of the content of the EMI subject courses without improving or only slightly improving their proficiency in English. It has also not been ascertained whether students in different disciplines react to and perceive the effects of their EMI courses similarly. Therefore, the major goal of this study is to answer these important questions based on the data collected through a larger-scale student survey. The results reported in this study are part of a research project of which the main goal is to evaluate the implementation of English-medium instruction for content courses in the three major colleges at one university in Taiwan. The perspectives of both students and teachers were examined in the project. Due to space limitations, however, this paper focuses only

on selected results obtained from the students. In this preliminary explor ation, in addition to the students' reactions to their EMI subject courses, influence of English-medium instruction on the students, difficulties that students encountered in their EMI courses, and their English language learning needs observed during the research process will also be discussed.

The research site of this study is a private university in northern Taiwan that has been devoted to the promotion of this English instruction policy for many years. In fact, this university is one of the few universities in Taiwan that first started to implement a university-wide English-medium instruction policy. At this university, there is a requirement for all undergraduate students in the three major colleges to complete at least 18 credits of EMI subject courses before graduation. In the fall semester of 2009, 179 EMI courses were offered to non-English majors at this university.

2. Methods

The methods used for data collection in this study include pilot interviews[6] with six students (one from each of the six departments selected), a student questionnaire, and in-depth, face-to-face interviews with six faculty members teaching EMI subject courses (one from each selected department). Additionally, post-questionnaire email exchanges with the faculty informants were also conducted for information verification and confirmation at the data analysis stage.

The student subjects in this study came from the three major colleges at this university— the College of Engineering, the College of Management, and the College of Informatics. One class of sophomores and one of seniors taking EMI subject courses in two departments from each of the three colleges were recruited for the questionnaire survey. About 20% of the students had experience of living in an English-speaking country or had studied in such a country for a short term (Table A in the appendix). Further, at the time of the administration of the questionnaire, all student subjects had already taken more than three EMI subject courses at the university. The disciplinary

breakdown of the student subjects who returned valid questionnaires is shown in Table 1.

Table 1 *Disciplinary distribution of student subjects*

College	Department	Sophomores	Seniors	Total
Engineering	Electrical Engineering (EE)	25	25	50
	Industrial Engineering Management (IEM)	40	36	76
Management	Business Management (BM)	40	40	80
	Finance (F)	17	26	43
Informatics	Information Communication (IC)	31	26	57
	Information Management (IM)	32	32	64
Total		185	185	370

The questionnaire was written in Chinese; it was four pages long with three major parts:

(1) Part One consisted of 11 questions asking for students' background information, such as English learning background, attitude towards English learning, self-evaluation of proficiency in English, and extra-curriculum English language activities.

(2) Part Two consisted of 18 questions relating to the implementation of the English-medium instruction policy in the real teaching situations, students' behavior in EMI courses (e.g., whether they pre-read the assigned textbook, whether they used the Chinese version of textbooks), students' reactions towards the EMI courses that they had taken, and the difficulties that they had encountered.

(3) Part Three consisted of five questions concerning the impact of having English as the medium of instruction on the students' learning of the subject content and on their English language proficiency. Questions relating to the students' "wants" for their English language learning in the future were also asked (Dudley-Evans & St John, 1998; Hutchinson & Waters, 1987). At the very end of the questionnaire, an open-ended question was asked to invite students' extra comments on their reactions towards English-medium instruction.

Due to space limitations and because the purpose of the present paper is to discuss students' reactions, only selected results from the detailed questionnaire will be discussed in the following sections. Data from the interviews with the professors will be used only in passing, where they serve to illuminate or complement the students' viewpoints.

3. Results and Discussion

3.1 Background of Subjects

Students' self-evaluation of their English proficiency[7]

As shown in Table 2, about half of the students rated themselves as "okay" when asked to self-evaluate their proficiency in each of the four skills of English. However, a closer examination of the data reveals that their self-evaluation scores vary for the different skills. It appears that these students tend to be more confident in their receptive skills (i.e., reading and listening), with reading rated as their best skill (only 22.2% of them rated themselves as poor or very poor, and 24.2% of them rated themselves as good or very good). In contrast, more than 40% of the students considered their proficiency in the productive skills (ie., speaking and writing) to be poor or very poor, while only about 10% of them considered their proficiency in either of these two skills to be good or very good. Another observation is that although the subjects in this study generally perceived that they had better receptive skills, there were still more than one third who rated their listening proficiency as poor or very poor.

Table 2 *Self-evaluation on the four skills*

	Listening	**Speaking**	**Reading**	**Writing**
Very poor	9.2%	9.2%	5.1%	10.9%
Poor	24.7%	36.7%	17.1%	30.4%
OK	48.4%	43.6%	54.0%	49.2%
Good	14.9%	8.4%	21.7%	8.7%
Very good	3.0%	2.4%	2.5%	1.1%

Students' attitude towards the English language

As far as the students' attitude towards English learning in general is concerned, most students felt interested or at least had no especially negative feelings towards it (see Table B in the appendix). Comparing the students from different departments, it appears that more students from the Department of Electrical Engineering (EE) and the Department of Information Communication (IC)—both technical disciplines—reported that they were either uninterested or strongly uninterested in learning English (20% and 21% respectively). Nonetheless, most of the students from these six departments did feel that being good in English is an important determinant of academic success in EMI courses (65.3%), and in their future careers (96.2%).

3.2 Students' reactions towards EMI courses

Students' comprehension level of EMI lectures

The results shown in Table 3 reveal that generally the students' self-reported comprehension level of the EMI lectures is not good. Very few (5.8%) reported that they were able to understand more than 90% of the lectures, and only about 24% of the students felt that they were able to understand more than 75%. Overall, for most of the students (about 40%), the comprehension level was about 50-74%.

Table 3 *Degree of comprehension of the EMI lectures*

Percentage of Lecture	EE	IEM	BM	F	IC	IM	Total
90% and above	10.2%	5.3%	8.8%	0.0%	5.4%	3.3%	5.8%
89%-75%	26.3%	22.4%	15.0%	21.4%	21.4%	8.3%	18.7%
74%-50%	18.4%	47.4%	45.0%	40.5%	30.2%	53.3%	40.3%
49%-25%	28.7%	17.1%	22.5%	28.6%	26.9%	16.7%	22.6%
24% and below	18.3%	7.9%	8.8%	9.5%	17.8%	18.3%	12.9%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

Comparing the students from the different departments, it appears that more students from the two technical disciplines—EE and IC—experienced difficulties in

lecture comprehension; about 47% and 45% respectively of the students in these two departments reported that they were able to understand less than 50% of the lectures. In contrast, only 25% to 38% of the students from the other four management-related disciplines reported that they were able to understand less than 50% of the lectures.

A Pearson correlation analysis reveals that among the many factors listed in Table 4, the degree of EMI lecture comprehension reported by the students is correlated most strongly with their self-evaluation of their English listening proficiency. Additionally, it is also correlated, though less strongly, to the students' self-evaluation of their abilities in the other three language skills and to the degree of their interest in learning the English language (Please see the items in italics shown in Table 4). These results seem to suggest that English proficiency (especially listening proficiency) of a high enough level is an important factor if students are to succeed in English-medium instruction. Therefore, for universities implementing this policy, the establishment of supplementary English courses/programs and/or the selection of students qualified for English-medium instruction could be crucial tasks.

Table 4 *Students' self-reported comprehension level of EMI courses*

	r value	**p < 0.01**
Self-evaluation of English listening proficiency	0.429**	0.000
Self-evaluation of English speaking proficiency	0.323*	0.000
Self-evaluation of English reading proficiency	0.3*	0.000
Self-evaluation of English writing proficiency	0.217*	0.000
Extra-curriculum English activities	-0.073	0.189
Self-evaluation of academic performance in general	0.173	0.002
Overseas living or study experiences	-0.221*	0.000
Degree of interest in learning English language	0.330*	0.000
Perceived importance of proficiency in English for current studies	0.14	0.012
Perceived importance of proficiency in English for future careers	0.069	0.213
Frequency of pre-reading the course textbook(s)	0.133	0.017
Frequency of referring to the Chinese version of the course textbooks	-0.102	0.067
Perceived degree of helpfulness of general English courses	0.043	0.438

Another interesting finding, one that seems counterintuitive at first, can also be deduced from Table 4: There is a very slight tendency for students with more overseas living or studying experiences to report lower comprehension levels than those without such experiences. Remarks from one of the instructors interviewed and comments obtained from informal talks with students at this university provide a possible explanation. Some of the students complained that the reason why they were unable to understand the lectures better was because their instructors did not speak good English. In fact, several students commented in their questionnaires that it would be better for instructors whose English speaking ability is not good enough not to use English to deliver their lectures. This finding tells us that in order to guarantee successful English-medium instruction, it is not only students' proficiency in English that should be improved, but that of the subject teachers as well.

Degree of students' satisfaction with EMI courses

Even though the students did not perceive themselves as achieving a high degree of English lecture comprehension, about 80% of the students from all the six departments felt satisfied with or at least neutral (i.e., no especially negative feelings) towards their EMI courses (Table 5). This rather unexpected result could be explained, at least partly, by other questionnaire data about the amount of English actually used in the EMI classroom.

Table 5 *Degree of satisfaction with EMI courses*

Degree of Satisfaction	EE	IEM	BM	F	IC	IM	Total
Very satisfied	0.0%	2.6%	1.3%	2.3%	5.3%	1.6%	2.2%
Satisfied	11.8%	32.9%	26.3%	16.3%	10.5%	25.0%	21.8%
Neutral	60.8%	44.7%	58.8%	69.8%	54.4%	51.6%	55.5%
Dissatisfied	28.1%	17.1%	7.5%	11.6%	17.7%	15.6%	15.8%
Very dissatisfied	0.0%	2.6%	6.3%	0.0%	12.6%	6.3%	4.9%

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Tables C and D in the appendix show that in real teaching situations, English was used more than 90% of the class time in only a minority of the courses carrying the label of "English-medium instruction." For many complex reasons (e.g., students' low proficiency in English, subject content, and time pressure), many of the courses were not actually conducted primarily in English. The amount of English language used varied greatly not only across different departments but across different courses within the same department. This result was confirmed in a recent corpus-based study on English lectures given by Taiwanese professors at the same university (Chang, 2009).

Based on both our student questionnaire data and the interview data collected from the professors, it seems that the Taiwanese professors at this university often switched from English to Mandarin during the class under the following circumstances: (1) when students looked confused; (2) when students asked for an explanation in Mandarin; and (3) when the concept introduced was difficult. Some of the professors even repeated the content in Mandarin after every chunk of lecture given in English. The switch between the native and the target language reflects the Taiwanese professors' awareness of students' potential difficulties. This considerate attitude might help reduce students' anxiety level, hence increasing the degree of their satisfaction with the EMI courses.

In addition, in the interviews with the six professors, we found that for various reasons (such as large class size, limited class time and students' poor writing and speaking abilities), these professors usually just "encouraged" their students to try to speak English in class and to answer their test questions in English, rather than forcing them to do so. This again helped to reduce students' anxiety level.

In assessing student satisfaction towards their EMI courses, although the majority of the students seemed to not have negative attitudes towards their EMI courses, it appears that more of the students from the two more technical fields (EE and IC) felt dissatisfied or very dissatisfied (Table 5). In order to discover the factors that affected the degree of student satisfaction, another Pearson correlation analysis was conducted. It was found that none of the factors listed in Table 6 were strongly correlated with the degree of a student's satisfaction with his/her EMI courses, except for a weak correlation with the degree of his/her interest in learning English, as well as with the

Table 6 *Factors influencing students' satisfaction with the EMI courses*

	r value	**p < 0.01**
Self-evaluation of English listening proficiency	0.141	0.011
Self-evaluation of English speaking proficiency	0.175	0.002
Self-evaluation of English reading proficiency	0.094	0.092
Self-evaluation of English writing proficiency	0.122	0.029
Extra-curriculum English activities	-0.01	0.854
Self-evaluation of academic performance in general	-0.023	0.686
Overseas living or study experiences	0.053	0.347
Degree of interest in learning English language	0.33*	0.000
Perceived importance of good English proficiency in current studies	0.148	0.008
Perceived importance of good English proficiency in future careers	0.1	0.072
Perceived degree of comprehension of English-instructed courses	0.265*	0.000
Frequency of previewing the course textbook(s)	0.186	0.001
Frequency of referring to the Chinese version of the course textbooks	-0.109	0.000
Perceived degree of helpfulness of general English courses	0.18	0.001

level of his/her lecture comprehension (Please see the items in italics shown in Table 6). This finding may explain why the students from the two more technical disciplines (EE and IC) seemed to feel more dissatisfied with their EMI courses than those from the other disciplines—because more among them also tended to dislike learning English and more among them reported a lower level of English lecture comprehension (Table 3).

3.3 Influence of English-medium instruction on the students

About one third (32.3%) of the students reported that instruction in English not only helped their learning of the subject content, but also helped them improve their English language proficiency (Table 7). However, another third (30.9%) of the students claimed that instruction in English was only helpful in enhancing their English language proficiency, but not helpful in their learning of the subject content. Nevertheless, overall, over 60% of the students completing the questionnaire thought that instruction in English helped them improve their English language proficiency (see bold-faced

Table 7 *Influence of instruction in English*

Influence	EE	IEM	BM	F	IC	IM	Total
English proficiency improved Subject learning enhanced	26.4%	38.9%	30.0%	31.7%	26.8%	38.1%	**32.3%**
English proficiency improved Subject learning not enhanced	26.4%	20.8%	47.5%	29.3%	32.3%	25.4%	**30.9%**
English proficiency unimproved Subject learning enhanced	28.8%	19.4%	12.5%	22.0%	12.4%	20.6%	18.5%
English proficiency unimproved Subject learning not enhanced	20.4%	20.8%	10.0%	17.1%	30.3%	15.9%	18.5%

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percentages in Table 7). In contrast, the effect of instruction in English on the learning of subject content per se remains unclear: as shown in Table 7, half of the students agreed that instruction in English facilitated their learning of subject content, while the other half disagreed.

Further, as shown in Table 8, among the four skills, listening was the one that most of the students (73%) felt improved after receiving instruction in English, and reading ranked second (28%). Less than 10% of the students felt that they made progress in their English speaking and writing. This result is not surprising at all because in most of the EMI courses investigated in this study and in lectures tape-recorded and collected in the aforementioned corpus-based study on English lectures (Chang, 2009), very few individual English-language speaking or writing activities were assigned by the teachers. It seems that listening to the lectures and reading the required English textbooks remain the two major (or even only) tasks for most of the undergraduates taking EMI courses at the university under investigation.

However, although a majority of students from all the six departments perceived improvement in their listening skill, only in Business Management (BM) is there a majority of students reporting a perceived improvement in reading skill. As can be also seen in Tables E and F in the appendix (which pertain to textbooks used in the EMI courses), compared with students from the other five departments, a greater number of BM students read the original English version of their course textbooks[8]. We will

Table 8 *Improvement of the four skills after instruction in English* (multiple choices permitted)

English Skill	EE	IEM	BM	F	IC	IM	Total
Listening	80.0%	77.6%	82.5%	60.5%	70.2%	65.6%	73.8%
Speaking	6.1%	10.5%	12.5%	4.7%	5.3%	7.8%	8.4%
Reading	18.5%	11.8%	51.3%	27.9%	21.5%	34.4%	28.5%
Writing	6.2%	7.9%	16.3%	7.0%	1.8%	6.3%	8.2%

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discuss this textbook reading issue in more detail in the following section.

3.4 Difficulties that students encountered in their EMI courses

As discussed previously, the overall degree of the students' lecture comprehension was not high. About 36% of the students thought that their difficulties derived only from the fact that the subjects taught in English were in themselves difficult (Table 9). In contrast, many more students (25.5% + 38.5% = 64%) believed that their difficulties could be attributed at least in part to difficulties they had with the English language. In line with the results reported in Evans and Green (2007), it was found in the present study that among the various language problems causing comprehension difficulties, limited vocabulary was reported by the greatest number of the students (42%).

Table 9 *Perceived difficulties in understanding EMI lectures*

	EE	IEM	BM	F	IC	IM	Total
Language difficulties	36.0%	20.3%	27.5%	16.3%	25.0%	28.1%	25.5%
Subject difficulties	36.9%	25.7%	48.8%	34.9%	41.0%	28.1%	35.9%
Both	28.3%	54.1%	23.8%	48.8%	35.8%	43.8%	38.5%

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As one of the teachers interviewed pointed out, the course textbook usually provides most of the vocabulary and terminology that the students need to understand

their EMI lectures. Therefore, reading the course textbook and materials before the class could be helpful to lecture comprehension. Similar comments were made by the Hong Kong graduate students in Flowerdew and Miller (1992). The questionnaire results of the current study, however, showed that very few of the Taiwanese students surveyed (1.6%) *regularly* read the course textbooks or materials before their classes; 63% of all the students pre-read the course text or materials for less than 25% of the classes in a whole semester, and 32% never read the course textbook before the class at all. Additionally, among those who did pre-read the course textbook, some read its Chinese version (Table E in the appendix). Without the input from the reading of the required English textbooks, it is no wonder the students found that their vocabulary was inad equate for EMI lecture comprehension.

Some of the students (18.6%) in this study also did not read the English course textbook even when reviewing the subject content after the class (see Table F in the appendix). One of the reasons might be that they also had difficulties in reading textbooks in English. Indeed, this was found to be the case from the student questionnaire results. Consistent with the findings of Chia, Johnson, Chia, and Olive (1999) and Evans and Green (2007), among the many problems causing their reading difficulties, limited vocabulary (42%) and slow reading speed (33%) were the most frequently reported. It is thus not surprising to find that the most popular strategy that the students used to overcome their reading difficulties was to use a dictionary (76%). The strategy ranked second was that of referring to the Chinese version of the course textbook or other Chinese reference books (70.2%).

These questionnaire results reveal that students tended to try to solve their reading problems on their own, without actively seeking assistance from those who were more knowledgeable and experienced (Table G in the appendix). This finding contrasts with what was observed in Evans and Green (2007, p. 14) that “Hong Kong students show a marked reluctance to consult dictionaries when reading, manifesting instead a dependency on other students and teachers.” Although discussing with current classmates was also another strategy often used by the Taiwanese students in this study (53.1%), most of them did not try to obtain assistance from their teachers or teaching

assistants after class, and they especially did not ask questions in class. Only about 18% of the students asked their teachers questions after class, and less than 10% of them asked questions in class.

In fact, all the six teachers interviewed complained that their students "did not ask questions at all." They further indicated that even when most of their students looked confused during the lectures, they still rarely asked questions. Given this avoidance of question asking, the students therefore could not obtain more effective assistance in improving their academic reading and lecture comprehension. What is even worse is that without the students' questions, the teachers might be less able to determine students' specific problems and difficulties in order to adjust their lectures in a timely manner. This may in turn further impede students' comprehension of the lectures.

To conclude this section, the results discussed in this section seem to show us a link between EMI lecture comprehension and English textbook reading. Without sufficient vocabulary acquired through reading the English textbook, students would suffer greatly in their lecture comprehension. Therefore, English courses training students in reading English textbooks can not only enhance academic reading skills, but also the lecture comprehension of students. Unfortunately, it seems that few universities in Taiwan offer such EAP reading course.

3.5 Students' wants in English language learning

With the students' EAP difficulties in mind, let us now examine their "wants" (Dudley-Evans & St John, 1998; Hutchinson & Waters, 1987) in future English language learning. As with the medical students in Chia *et al.* (1999), in the current study, listening was the skill that the greatest number of the students wanted to improve through their future English language courses, followed closely by speaking, then writing, and more distantly by reading (Table 10). It is interesting to note that although listening was the skill that the students perceived to have improved the most after taking EMI courses, it was still regarded by the students as the most important one to improve. This result is rather different from what was reported in Hyland (1997) and Littlewood

Table 10 *Skills students wanted to further improve* (multiple choices permitted)

Skill	EE	IEM	BM	F	IC	IM	Total
Listening	76.4%	59.2%	53.8%	62.8%	48.0%	59.4%	59.1%
Speaking	66.0%	44.7%	61.3%	55.8%	57.9%	57.8%	56.8%
Reading	44.3%	39.5%	33.8%	25.6%	24.9%	32.8%	33.9%
Writing	58.3%	53.9%	46.3%	48.8%	39.3%	37.5%	47.2%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

and Liu (1996); in their studies, academic writing was the main source of concern for both students and teachers in Hong Kong universities. Nevertheless, given the fact that listening and reading were the two skills used the most frequently in most of the EMI courses for undergraduate students at the university under investigation, and given that the English language teaching these Taiwanese students receive since junior high school had focuses mostly on reading with relatively little emphasis on listening, this student want can be easily understood.

As far as students' reaction towards their required general English language (GE) courses is concerned, in spite of the university's great efforts and investments in improving the students' proficiency in English[9], in general, the students still seemed unsatisfied with their GE courses. About 50% of the students (see boldfaced percentages in Table 11) perceived their GE courses to be not helpful or not helpful at all for their learning in the EMI subject courses, while only about 21% of them thought that they were helpful or very helpful. These findings correspond to those documented in Evans and Green (2007) and Kirkgöz (2009).

In the pilot interviews with six students, a major complaint was that the English language used in their EMI subject courses was much more complicated and difficult than what they had learned in their sheltered and simplified GE courses. In fact, this gap between the GE courses and the English language skills needed for the EMI courses has already been pointed out by many EAP scholars (e.g., Dudley-Evans & St John, 1998; Evans & Green, 2007; Hutchinson & Waters, 1987; Swales, 1988; Widdowson, 1998). For example, Evans and Green (2007, p. 5), reviewing previous needs analyses

Table 11 *Perceived degree of helpfulness of the required GE courses*

	EE	IEM	BM	F	IC	IM	Total
Very Helpful	6.2%	17.1%	3.8%	2.3%	3.5%	0.0%	6.0%
Helpful	24.5%	19.7%	8.8%	14.0%	10.7%	14.1%	14.9%
Neutral	36.6%	18.4%	36.3%	34.9%	17.9%	29.7%	28.4%
Not Helpful	28.0%	22.4%	33.8%	44.2%	43.9%	35.9%	**33.7%**
Not Helpful at all	6.0%	22.4%	17.5%	4.7%	25.0%	20.3%	**17.0%**

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

conducted on Hong Kong undergraduate students, concluded:

> *The finding of needs analyses conducted in the past decade indicate that most Hong Kong undergraduates not only require language support at university (and probably more than they currently receive), but also that this support should be oriented towards academic rather than general English.*

In the questionnaire used in this study, several common EAP courses and one ESP course (workplace English) were listed, and the students were asked which courses they might be interested to take. As shown in Table 12, except for lecture note-taking, all the other courses attracted interest from more than one third of the students. The reason why fewer students were interested in lecture note-taking might be due to the widespread use of PowerPoint and the common practice of instructors' supplying handouts to students nowadays.

Among all courses listed, the three most popular ones were: English communication and discussion skills (58.4%), workplace English (55.1%), and English lecture and speech comprehension (46.5%). Four other popular "wanted" courses included: English report writing (38.5%), English presentations (38.0%), English research paper and thesis writing (32.1%), and critical reading and writing (30.8%). These results seem to reflect both students' anxieties over the use of English in their future careers and students' wanting to improve their speaking and listening skills in

Table 12. *ESP/EAP courses students would be interested in taking (multiple choices permitted)*

	EE	IEM	BM	F	IC	IM	Total
Pre-academic English: Critical reading and writing	36.10%	39.50%	45.00%	18.60%	19.60%	26.20%	30.80%
English lecture note-taking	21.40%	36.80%	23.80%	18.60%	25.00%	23.40%	24.80%
English lecture and speech comprehension	47.40%	46.30%	45.00%	48.80%	49.50%	42.20%	46.50%
English presentations	23.00%	44.70%	56.30%	20.90%	19.60%	28.10%	38.00%
English communication and discussion skills	57.20%	48.70%	71.30%	60.50%	51.70%	60.90%	58.40%
English report writing	14.30%	39.50%	76.30%	37.00%	37.40%	26.20%	38.50%
English research paper and thesis writing	16.10%	44.70%	62.50%	23.30%	19.60%	26.20%	32.10%
Workplace English	49.10%	61.80%	41.30%	69.80%	49.10%	59.40%	55.10%
Others	5.40%	3.90%	0.00%	2.30%	5.40%	1.60%	3.10%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

their future English learning (see Table 10). It is thus suggested that universities implementing English-medium instruction should consider offering such EAP/ESP courses to their students in order to support their learning in EMI. In addition, as indicated previously, English textbook reading, although not included in the list shown in Table 12, should also be considered as another option for students.

4. Conclusion

Overall, although the students in this study generally did not think that they had a high level of comprehension of their EMI lectures, most of them at least did not show negative attitudes towards the courses, probably due to their professors' various efforts in reducing their anxiety level in the classroom. Moreover, while the effects of English-medium instruction on the learning of subject content remain unclear, most of the students surveyed agreed that English instruction helped them improve their English

language proficiency, especially in terms of listening. Given these findings, and similar findings reported in Hsieh and Kang (2007) and Wu (2006), we suggest that EMI subject courses could be regarded as extra opportunities to improve the English language proficiency of undergraduate students. These courses provide students with more opportunities to learn English through receiving and producing authentic English language in real communicative contexts (Brandl, 2007; Swales, 1990).

However, caution should still be called for as we see that the level of English lecture comprehension is influenced by students' current English language proficiency (especially listening proficiency) and that a great majority of students did report that their difficulties in EMI courses can be partly attributed to difficulties they had with the English language. In order to achieve a better overall quality of student learning in EMI courses, universities implementing an EMI policy should increase resources to support their students' English language learning. However, although many universities in Taiwan have recognized the importance of English ability and have tried to increase the number of English language courses in their institutions, most of the courses offered are still restricted to general English skills. As the findings of this study show, most of the students are dissatisfied with their current GE courses because the skills trained and content taught in these courses often cannot meet their real EAP needs. We should therefore repeat again that Taiwanese undergraduate students not only require more language support at their universities, but "this support should be oriented towards academic rather than general English" (Evans & Green, 2007, p. 5). More EAP language courses, especially content-based EAP courses (Evans & Green, 2007), should be offered to equip students with appropriate language skills to survive in their EMI courses.

For universities that do not have sufficient resources to do so, there are two other strategies worth considering. One is to offer voluntary, non-credit-bearing EAP language courses that students pay for. The other strategy is to restrict participation in EMI courses to only students who have sufficient proficiency in English and at the same time design their EMI curriculum with great caution. Nevertheless, there remains one critical question: Should the Taiwanese Ministry of Education establish certain

protocols for deciding whether a university will be allowed to implement an EMI policy?

As mentioned in the introduction, the present study reports only part of a large project investigating both students and teachers involved in English-medium instruction at a Taiwanese university. Although professors' reactions and difficulties are not discussed in this paper, it was reported earlier that several students complained that the reason why they were unable to have good comprehension of their English lectures was because some of their professors did not speak good English. This stands as a cautionary reminder to university administrators that in addition to careful selection of teachers qualified for offering EMI courses, universities should also provide their faculty members involved in English-medium instruction with better resources and support. Apart from various teaching strategies, training programs in oral English presentation skills should also be offered.

Although many Taiwanese universities have invited speakers to give talks on how to teach content courses in English to Taiwanese students, to my knowledge, most of these talks did not focus specifically on how to use the English language effectively in lectures. In fact, relatively few short- or long-term EAP courses have been specifically designed for Taiwanese professors teaching EMI subject courses. Recently, several universities (such as Yuan Ze University and Asia University) have started planning such courses (to be taught by EAP experts) for their faculty members. These efforts are to be applauded, and it is hoped that more universities will undertake such EAP endeavors.

Finally, as a preliminary exploration, this study provides only a rough sketch of Taiwanese undergraduate students' reactions towards English-medium instruction for subject courses. Many questions still remain: For example, do non-native English speaking (NNS) students in different types of universities encounter different language problems in their EMI courses? What English language problems do NNS teachers encounter in their EMI courses? What are the effective strategies used or could be used by NNS teachers giving English instruction to overcome their English language difficulties? Do NNS students with different English proficiency levels encounter

different problems in EMI courses? Do NNS students at different education levels (e.g., graduate vs. undergraduate) react differently to English-medium instruction and encounter different types of problems in their EMI courses? These and other questions need to be thoroughly investigated in further research before we can more effectively apply the results of this and other studies in real-world contexts.

Notes

1 Actually, this trend has already expanded to secondary education in some non-native English speaking countries (Hu, 2009).

2 For a list of predictable problems, please see Coleman (2006, pp. 6-7).

3 "The need to teach subjects in English, rather than the national language, is well understood: in the sciences, for example, up-to-date textbooks and research articles are obtainable much more easily in one of the world languages and most readily of all in English." (Graddol, 1997, p. 45)

4 European CLIL resembles the foreign-language-across-the curriculum (FLAC) model of content-based language instruction approach in North America. "Learners acquire the target language (TL) naturally by studying content through it⋯, TL exposure is increased without a correspondingly higher demand on precious curriculum time." (Coleman 2006, p. 4)

5 The subjects of this study were 7802 students in 56 high schools in Hong Kong. The results showed that in the early high school years, instruction in English had substantial negative effects on both academic self-concept and academic achievement.

6 The purpose of the pilot interviews was to help design a more appropriate and effective questionnaire.

7 In the questionnaire, we asked for their scores for English in the National Entrance Examination, their final General English course, and other standard English tests (GEPT, TOEFL, TOEIC) for comparison purposes, but many of them skipped this part. Therefore, only their self-assessment was reported.

8 Our questionnaire results also showed that the major reason why a greater portion of BM students read their English textbooks is that no Chinese version of the textbooks was available.

9 The undergraduate students at the university investigated in this study are required to take at least 12 credits of GE courses over four semesters.

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Appendix

Questionnaire Results

Table A. *Overseas experience in English-speaking countries*

	EE	IEM	BM	F	IC	IM	Total
No	94.0%	80.3%	63.7%	83.7%	82.5%	92.2%	81.4%
Yes	6.0%	19.7%	36.3%	16.3%	17.7%	7.8%	18.6%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

Table B. *Degree of interest in learning English language in general*

	EE	IEM	BM	F	IC	IM	Total
Strongly interested	10.0%	14.5%	21.3%	18.6%	8.8%	12.5%	14.6%
Interested	26.0%	39.5%	30.0%	32.6%	38.6%	26.6%	32.4%
Neutral	44.0%	30.3%	36.3%	44.2%	31.6%	48.4%	38.4%
Uninterested	10.0%	14.5%	5.0%	4.7%	14.0%	6.3%	9.2%
Strongly uninterested	10.0%	1.3%	7.4%	0.0%	7.0%	6.3%	5.4%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

Table C. *Amount of English used in the most favorite EMI course*

	EE	IEM	BM	F	IC	IM	Total
More than 90%	10.0%	15.3%	6.4%	10.8%	8.2%	11.6%	10.3%
89%-75%	26.0%	33.3%	16.7%	24.3%	14.3%	20.9%	22.8%
74%-50%	18.0%	38.9%	33.3%	40.5%	32.7%	18.6%	31.0%
49%-25%	28.0%	6.9%	25.6%	16.2%	26.5%	25.6%	21.0%
Less than 25%	18.0%	5.6%	17.9%	8.1%	18.4%	23.3%	14.9%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

Table D. *Amount of English used in the least favorite EMI course*

	EE	IEM	BM	F	IC	IM	Total
More than 90%	19.6%	25.4%	7.7%	24.2%	20.8%	13.0%	17.6%
89%-75%	17.6%	26.8%	6.4%	27.3%	17.0%	24.1%	18.8%
74%-50%	25.5%	31.0%	26.9%	27.3%	26.4%	29.6%	27.9%
49%-25%	33.3%	9.9%	21.8%	15.2%	30.2%	20.4%	21.5%
Less than 25%	3.9%	7.0%	37.2%	6.1%	5.7%	13.0%	14.1%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

Table E. *Version of textbook read before the class* (only for those who did so)

	EE	IEM	BM	F	IC	IM	Total
English version	32.3%	15.4%	63.3%	27.3%	17.1%	36.6%	33.7 %
Chinese version	35.5%	19.2%	13.3%	24.2%	51.1%	22.0%	26.0%
Both	32.3%	65.4%	23.3%	48.5%	31.7%	41.5%	40.3%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

Table F. *Version of textbook used for reviewing the course content*

	EE	IEM	BM	F	IC	IM	Total
English version	24.0%	40.8%	58.8%	27.9%	14.0%	43.8%	37.3%
Chinese version	24.0%	14.5%	11.3%	14.0%	40.4%	12.5%	18.6%
Both	52.0%	44.7%	30.0%	58.1%	45.6%	43.8%	44.1%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management

Table G. *Strategies used to overcome difficulties in reading English textbooks* (multiple choices permitted)

	EE	**IEM**	**BM**	**F**	**IC**	**IM**	**Total**
Review the text more times	26.9%	25.0%	21.3%	7.1%	16.1%	25.0%	20.2%
Refer to the Chinese version of textbook	82.5%	60.5%	57.5%	78.6%	70.2%	71.9%	70.2%
Use a dictionary	75.4%	86.8%	62.5%	83.3%	66.7%	81.3%	76.0%
Ask the teacher in class	5.5%	3.9%	23.8%	7.1%	5.4%	1.6%	9.3%
Ask the teacher after class	9.0%	15.8%	31.3%	26.2%	16.1%	10.9%	18.2%
Ask a friend	19.3%	44.7%	57.5%	38.1%	45.6%	25.0%	38.4%
Discuss with current classmates	42.1%	46.1%	67.5%	59.5%	45.6%	57.8%	53.1%
Ask a senior classmate	0.0%	11.8%	6.3%	16.7%	9.0%	3.1%	7.8%
Ask the TA	7.2%	15.8%	10.0%	26.2%	5.4%	9.4%	12.3%
Other	0.0%	2.6%	0.0%	2.4%	1.8%	0.0%	1.1%

EE = Electrical Engineering; IEM = Industrial Engineering and Management; BM = Business Management; F = Finance; IC = Information Communication; IM = Information Management