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**Title of the manuscript:**

Discipline-specific language learning outcomes in EMI programs in the People's Republic of China

**First Author (Corresponding Author)**

First name: **Mengjia** Last name: **Zhang**

Affiliation: Departament de Filologia Anglesa i de Germanística, Universitat Autònoma de Barcelona, Spain.

Postal address: Carrer de la Fortuna. Edifici B. Facultat de Filosofia i Lletres. 08193 Bellaterra (Cerdanyola del Vallès), Barcelona, Spain

E-mail: Mengjia.Zhang@e-campus.uab.cat

Telephone: +34 722468733

Fax: +34 5812001

**Co-Author**

First name: **Elisabet** Last name: **Pladevall-Ballester**

Affiliation: Departament de Filologia Anglesa i de Germanística, Universitat Autònoma de Barcelona, Spain.

E-mail.: [elisabet.pladevall@uab.cat](mailto:elisabet.pladevall@uab.cat)

English Medium Instruction (EMI) practices in the People's Republic of China (PRC) are still emerging and in need of further empirical investigation, in comparison to European countries. Existing research in the Asian context is mainly based on students' and teachers' perceptions and policy-related concerns. There is a remarkable lack of studies assessing students' language and content learning outcomes through objective tests. This study specifically reports on language learning outcomes data in two EMI programs, namely Film Production and International Trade, taught by non-Chinese international teachers. Pre-post discipline-specific vocabulary and writing tests as well as pre-post grammar proficiency tests were conducted over the course of one semester and after the same number of hours of exposure. Results show that almost no progress was made as regards their general English grammar proficiency, as expected, but gains were found in productive and receptive vocabulary tasks and in the three measures of the writing task. The greatest gains emerged in the International Trade group in the vocabulary tasks and no differences were observed between the groups in the writing task. Results are discussed in relation to classroom teaching practices in the two groups, which were observed three times over the course of the semester.

**Keywords:** EMI, discipline-specific language learning, productive vocabulary, receptive vocabulary, classroom teaching practice.

## 1. Introduction

English-medium instruction (EMI) is a growing global phenomenon (Dearden, 2014). Particularly in higher education institutions (HEIs), the number of EMI courses is rapidly increasing (Briggs, Dearden & Macaro, 2018; Dafouz & Camacho-Miñano, 2016). HEIs are willing to implement EMI programs as a consequence of their internationalization process, which is often aimed to attract international students, prepare local students to work and study in a globalized competition, as well as to increase the international profile of local universities (Galloway, Kiriukow & Numajiri, 2017). Language is not a primary teaching aim in EMI but functions as a vehicle through which academic content is delivered, and this makes it different from other forms of content-based teaching (Briggs et al., 2018; Galloway, Numajiri & Rees, 2020). Nevertheless, EMI is frequently claimed to benefit both language and content learning. In East Asia, particularly, the implementation of EMI programs is highly associated with the policy-level objective of improving students' English proficiency, and recent years have witnessed an unprecedented growth of EMI programs in the area (Galloway et al., 2020).

Along with the flourishing of EMI programs, researchers have touched upon the EMI field with great variability in topics such as EMI policy, EMI perceived benefits and drawbacks, teacher training, integration of language and content, students' motivation and students' content and language learning outcomes. Overwhelmingly, research has mainly examined stakeholders' attitudes towards EMI. A great number of studies (Aguilar & Rodríguez, 2012; Byun et al., 2010; Costa, 2017; Galloway et al., 2017; Hernández-Nanclares & Jiménez-Muñoz, 2017; Li, 2017; Tatzl,

2011; Wei, Feng & Ma, 2017; Yang, 2016; Yeh, 2014) have generally found that teachers or students are positive towards EMI and are generally convinced of its advantages for language development. At the same time, some express more dubious attitudes towards the well-touted EMI effects on linguistic gains (Bozdoğan & Karlıdağ, 2013; Jiang, Zhang & May, 2019; Yang, 2015), or concerns about content comprehension (Byun et al., 2010; Doiz, Costa, Lasagabaster & Mariotti, 2019; Hernández-Nanclares & Jiménez-Muñoz, 2017; Li, 2017; Tatzl, 2011; Yang, 2015).

Despite the fact that some studies claim stakeholders perceive that EMI improves their English proficiency (Byun et al., 2010; Yeh, 2014), empirical research measuring the effectiveness of EMI in learning outcomes is scarce (Dafouz & Camacho-Miñano, 2016; Dafouz, Camacho & Urquia, 2014; Galloway et al., 2020; Guo et al., 2018; Hernández-Nanclares & Jiménez-Muñoz, 2017; Macaro, Curle, Pun, An & Dearden, 2018; Yang et al., 2019). Questions concerning the quality of EMI implementation, and to what extent EMI can fulfill its expected content and language learning goals remain unanswered. It seems to be very common that students and teachers face language-related challenges in the implementation of EMI in non-Anglophone contexts (Galloway et al., 2017).

This research study is part of a larger project, which investigates EMI practices in three non-linguistic disciplines (International Trade, Film Production, and Project Management) in three Chinese universities, where students' and teachers' perceptions, EMI and foreign language learning motivation as well as discipline-specific language gains (Nagy & Townsend, 2012) will be studied by means of questionnaires, interviews, focus groups, tests and classroom observations over the course of one semester. This paper will report data from two institutions, mainly on discipline-specific language pre and posttests. More specifically, it will explore discipline-specific language learning as measured by productive and receptive vocabulary tests as well as a writing task in two different subject areas, namely Film Production and International Trade, exposed to the same amount of in-class exposure over the course of a semester. Classroom observation data and students' background information collected by a questionnaire survey will also be considered to interpret the results.

## **2. Empirical research on language learning outcomes in EMI programs**

EMI is defined as “The use of the English language to teach academic subjects in countries or jurisdictions where the first language (L1) of the majority of the population is not English” (Dearden, 2014, p. 2). Apparently, mastery of subject content is the predominant focus while language learning is not an explicit aim. In fact, English functions as a vehicle for delivering content (Brown & Bradford, 2017), for instructional purposes only, instead of a subject being taught (Pecorari & Malmström, 2018). Additionally, researchers (Galloway & Rose, 2015; Jenkins 2018; Pecorari & Malmström, 2018) argued that ELF (English as a Lingua Franca) is the kind of language used in EMI approach, rather than native-like English. It is likely the case that teaching

staff and students do not share the same L1 but speak different mother tongues in international universities in non-Anglophone countries (Jenkins, 2018).

Although language learning in EMI contexts is not the primary intended outcome and is normally ignored (Pecorari & Malmström, 2018), improvements in English proficiency could be an implicit outcome of learning subjects through English (Airey, 2017; Brown & Bradford, 2017). In EMI contexts, development in language skills is often expected, as it is believed to be a natural or incidental result of exposure to the use of English (Airey, 2017) as no explicit focus on form is fostered. However, the assumption that language learning will take place incidentally is not convincing given the current evidence. Thus it is suggested that more empirical research be carried out to assess to what extent language learning outcomes are present in EMI (Dafouz et al., 2014; Macaro et al., 2018; Smit & Dafouz, 2012).

As for research on language learning outcomes, findings are inconclusive and previous studies have focused on very different aspects in a variety of contexts. While a group of researchers (Aguilar & Muñoz, 2014; Hernández-Nanclares & Jiménez-Muñoz, 2017; Li, 2017; Rogier, 2012; Yang, 2015) reached a consensus that students improved their language proficiency after taking EMI programs, others (Guo et al., 2018; Lei & Hu, 2014), however, did not find evidence for students' language development.

More specifically in Spain, Aguilar and Muñoz (2014) conducted a pre-post test analysis of English proficiency with 63 engineering students over the course of a semester (60 hours) and their results revealed that students made significant gains in listening but non-significant gains in grammar. Also, those who had a lower initial English level benefited more from the EMI course as they improved significantly more in listening and grammar than those who were more proficient in English at the start of the study. Hernández-Nanclares and Jiménez-Muñoz (2017), based on a Spanish university, assessed business students' (n=172) English proficiency at the beginning and the end of the year by means of observed and recorded students' discourse, tutorial practice, and written exams. Their data showed less than half a Common European Framework of Reference for Languages (CEFR) level progress in the four skills (reading, writing, speaking, and listening). Along the same lines, Rogier (2012) carried out a four-year longitudinal study in the United Arab Emirates (UAE) and found that students displayed significant gains in the four skills (speaking, reading, writing and listening) via pre-post IELTS tests. In Taiwan, Yang's (2015) two-year longitudinal study also evidenced significant progress in receptive linguistic skills comparing scores between pre and posttests and exhibited a positive correlation between learners' receptive and productive skills. Li's (2017) study, conducted in the People's Republic of China (PRC) additionally supports that EMI is beneficial for students' language skills (vocabulary, reading comprehension and morphological awareness) as the pre-post test results revealed after a one-semester EMI program. However, it should be noted that none of these studies employed a comparison group (i.e. non-EMI group) to validate their improvements and therefore it is possible that students' language progress is caused by their other regular English classes or exposure to English activities after class. All of them dealt with general English proficiency and

hence a control group would have been desirable to corroborate their results. Alternatively, language that is specific to the discipline taught should be tested, which is actually the kind of language EMI students are exposed to.

Although these studies show promising results as regards students' linguistic gains, this is not always the case for EMI programs. In the PRC, Guo et al. (2018) and Lei and Hu (2014) found that the EMI students did not differ from their CMI (Chinese Medium Instruction) peers in the results of standard English proficiency tests, which suggested that EMI did not fulfill its expected benefits of improving students' English proficiency. Thus, it remains to be seen if the top-down, mechanically implemented EMI policy in the PRC can lead to favorable language learning outcomes (Guo et al., 2018). Lei and Hu (2014, p. 119) pointed out that "A more plausible interpretation is that the focal EM program was deficient in important ways so that it was incapable of delivering what is generally expected of EMI – enhancing students' English proficiency and fostering positive affect in English learning and use". They raise concerns on the quality of the implemented EMI course, highlighting possible problems such as "gaps between the purported program goals and actual practice, inadequate command of English as the medium of instruction and learning, and poor pedagogical strategies adopted to cope with language difficulties" (Lei & Hu, 2014, p. 119). Moreover, the standard English proficiency tests may fail to capture students' linguistic gains as there is a misalignment between the general English proficiency tests and the targeted discipline-specific English language in the EMI class (Guo et al., 2018; Lei & Hu, 2014). Likewise, Dafouz et al. (2014) proposed that "attention to learners' academic literacy in the target language would also be required in the form of specific disciplinary language exams (p. 233)", calling for more effective instruments measuring discipline-specific language gains, which is one of the gaps that the present study aims to fill.

### **3. EMI in the PRC**

The milestone of EMI in the PRC was in 2001 when the Ministry of Education (MOE) launched several guidelines to enhance educational quality for undergraduate programs. It explicitly set the objective to improve students' professional subject knowledge as well as English proficiency to strengthen their competitiveness in the global market. Since then, EMI courses mushroomed in tertiary institutions across the PRC. However, only a relatively small number of studies empirically examined the quality of the implemented programs (Guo et al., 2018; Lei & Hu, 2014; Li, 2017), and it is largely unknown to what extent the dual objective promoted by the government has been achieved.

Importantly, EMI programs in the PRC vary considerably in the amount of EMI used in the classroom. Not all programs are exclusively taught in English. In fact, many have combined both Chinese and English as the official medium of instruction languages (Zhao & Dixon, 2017). Researchers have observed very different types of EMI in this regard. For example, EMI was added gradually from 50%-100% in Guo et al. (2018), or nearly 70% of the class time was

exclusively Chinese, whereas EMI occupied only very little (Tong & Tang, 2017). In Xu (2017), EMI programs based on 7 cities in the PRC were explored and three different EMI models were found, namely Chinese as the main medium of instruction (CMMI) (English used represents less than 30%), English and Chinese balanced instruction (ECBI) (English used ranges from 40%-60%), and English as the main medium of instruction (EMMI) (English used represents more than 70%). The researcher found that the EMMI model had the most support from students while the CMMI the least. It thus indicated that the amount of EMI used may affect its quality, its outcomes and the students' experience.

EMI in the PRC is dominated by local teachers, even if the government has been promoting HEIs to create more employment for foreign teachers to promote internationalization. The reality is that progress in this regard is still at its preliminary stage, and the international teacher employment rate in HEIs is still low. An official government-led survey report on the development of the PRC's higher education internationalization (Chen, 2019) reveals that each university has on average 18 foreign teachers, accounting for 1.8% of the total number for full-time teachers. Meanwhile, only 1.97% non-linguistic EMI courses are taught exclusively in English. To our knowledge, there is no publication on EMI courses taught by foreign teachers in HEIs in the PRC. The present study attempts to fill this gap, as it empirically explores EMI programs taught by foreign teachers.

Regarding teaching methodology, a number of researchers (Jiang et al., 2019; Tong & Tang, 2017) reveal that traditional teaching styles, namely, a teacher-centered way of delivering content dominate EMI teaching practices, and students are offered very few opportunities to interact in class. Hence, whether the government-promoted goal of improving students' English proficiency can be successfully achieved remains to be seen.

In addition, the level of EMI development in different university tiers also varies to a great extent. For example, the most privileged, top-class universities such as Peking, Fudan and Tsinghua Universities do not only lead EMI development in the PRC but also enjoy the best financial and educational resources. In contrast, other types of universities may have fewer resources supporting their EMI development. Second-tier universities typically include public, provincial, and municipal-funded tertiary institutions and third-tier universities are normally private institutions (Feng et al., 2017). The report on the development of the PRC's higher education internationalization (Chen, 2019) reveals two major types of imbalance as regards internationalization in higher education in the PRC. On the one hand, a significant difference is found between local universities (provincial and municipal) and the central-subordinated universities. On the other hand, universities based on central and western regions are lagging far behind the universities in the eastern region. The report also highlights the hugely unbalanced distribution of funding for internationalization in HEIs among different geographical areas.

The majority of previous EMI research in the PRC has been carried out in the most developed regions, with top-tier institutions, whereas little is known on EMI implementation in less developed areas. According to our knowledge, none of the documented studies has investigated

EMI programs based on Xi'an, a second-tier city located at the heart of the PRC. Also, Feng et al. (2017, p. 166) noted that "there does not seem to be official statistics detailing all EMI programs run in universities in the PRC. Published sources indicate that the scale of implementing EMI policy is extensive and far reaching." Therefore, there is no doubt that EMI research should extend to different regions and less privileged universities, as it is the case with the participating institutions in the study, thus making an effort to offer a more comprehensive view of EMI in the PRC.

### **3. EMI in the PRC (the last paragraph)**

Feng et al. (2017, p. 166) noted that "There does not seem to be official statistics detailing all EMI programs run in universities in China. Published sources indicate that the scale of implementing EMI policy is extensive and far reaching."

## **4. Methodology**

### **4.1 Aim and Research questions**

In order to contribute new and more precise data to the existing research, the focus of this study is assessing EMI Chinese students' learning outcomes on discipline-specific language knowledge as well as general English proficiency over the course of one semester in two different disciplines. The following research questions guide the study:

- (1) To what extent will students improve their discipline-specific receptive and productive vocabulary after one semester?
- (2) To what extent will students improve their writing skills (in terms of task achievement, discipline-specific vocabulary and general English vocabulary) after one semester?
- (3) To what extent will students improve their general English proficiency after one semester?
- (4) Are there differences between the two disciplines analyzed (i.e. International Trade vs Film Production)?

### **4.2 Participants and universities**

Participants were students from two disciplinary higher education programs, namely International Trade and Film Production, which were taught in two public universities in Xi'an, the PRC. Xi'an is a second-tier city, and is relatively less developed compared with first-tier cities such as Beijing or Shanghai. The two focal universities share similar contexts as they are both provincially-funded, comprehensive universities, and are at similar university national ranks. The larger project also administered a questionnaire for participants to elicit their background information and asked whether they were exposed to extracurricular English courses during the semester, whether they had experience studying abroad before and if they plan to study abroad in the future. The data showed that the majority of the participants from the two programs did



not take any extra English courses during the semester. Only 8.9% (4/45) of the film students and 11% (11/99) of the trade students did. Besides, only one student from each program had previous experience studying abroad. In response to whether they plan to study overseas in the future, 13% (6/45) students from the Film program and 31% (31/99) students from the Trade program answered affirmatively.

There were no pre-selection criteria for students' enrolling in the courses as all students were required to take part in the programs as their compulsory courses. The lecturers were international teachers who were employed by the institutions to teach subject courses in English. As is mentioned above, it is promoted by the government that HEIs employ foreign teachers to teach in their institutions.

Participants from university A were 99 (32 males and 67 females, mean age 20.3 years) second-year undergraduate students and majored in International Trade and Economics. They took the 32-hour international trade course during the semester. The teacher was Spanish, held a master's degree, had a teaching experience of more than five years, and it was his fourth year teaching this program at the university. English was his only instructional language when teaching the course. At the same time, the students took a business English course which amounted to 32 hours.

Participants from university B were 45 (10 males and 35 females, mean age 20.6 years) third-year undergraduate students and majored in Television and Radio Editing. They took the 32-hour film production course during the semester. The teacher was also Spanish, held a master's degree, had a teaching experience of more than ten years, and it was his second year teaching this program at the university. English was his only instructional language when teaching the course. A student assistant was interpreting the lectures from English to Chinese when necessary.

## **4.3 Instruments**

### **4.3.1 Discipline-specific vocabulary and writing tests**

The international trade and film production discipline-specific vocabulary and writing tests were developed based on the teaching materials of the two programs, revised according to the EMI teachers' suggestions, piloted and revised accordingly. The tests instructions were written both in English and Chinese, and English was the only language allowed when answering the tests. There were thirty items in the vocabulary section, namely fifteen for productive and fifteen for receptive vocabulary, whose purpose was to measure students' discipline-specific vocabulary gains. More specifically, the vocabulary tasks consisted of a completion exercise with sentences and images (for productive vocabulary) and a definition and target lexical item matching exercise (for receptive vocabulary). The productive vocabulary tasks included eleven sentences with missing lexical items to complete the sentences, where the first letter of the missing word was provided. The other four items were to be provided below four content-related images. As regards the receptive vocabulary tasks, the learners had to match sentence definitions and images to their corresponding lexical items. All the vocabulary items selected were those

keywords of the courses, that is, they were highlighted key concepts from different lessons. The design of the tasks ensured that terms from all the units of the course were included. These were checked by the content teachers, and then piloted and revised accordingly.

As for the writing part, a content-based essay question was designed that required a 200-word passage. The topic for the Film task group was to explain what major film pre-production consists of and how its different stages are sequenced. The International Trade writing task asked how to create an international marketing plan, including essential steps and tools. Those two topics were decided by suggestions from the content teachers and aimed to cover overall knowledge learnt throughout the whole semester, instead of any specific concepts from a single lesson.

Three assessing criteria were used, namely task achievement, discipline-specific vocabulary range and accuracy and general English vocabulary range and accuracy. These assessment criteria were designed to measure gains in content knowledge, discipline-specific vocabulary and general English vocabulary, respectively. The writing assessing criteria were adapted from IELTS writing task (IELTS), ranging from band 0 to 9. The pre and posttests conducted had the same content and were different only in the order of the items.

#### **4.3.2 English General Proficiency placement tests**

A quick placement test (Outcomes Placement Test, Cengage) was adopted to measure students' English general proficiency. It is provided by Cengage (National Geographic learning), specialized in ELT textbooks and resources. This test has already been used in a similar context in Taiwan to measure university students' pre and post English proficiency before and after one semester's English learning with online materials. (Goetz, 2016). It consists of 50 multiple-choice question items testing grammar and vocabulary and was aimed to measure students' general English proficiency at the beginning and the end phase of the semester. The pre and post tests were only different regarding the order of the items.

#### **4.3.3 Classroom observations**

A classroom observation checklist, which was developed with the help of current relevant literature (Fortune, 2000; Wewer, 2017), and field notes were used to observe the classes of the two programs in order to have insights into the type of EMI practices used and in order to interpret the students' potential learning outcomes. The checklist elicits information on seven major themes, which are language use in the class, teaching objectives and lesson plans, content presentation and activities, language scaffolding in the class, students' and teachers' interactions, classroom atmosphere and linguistic skills used for in-class tasks (see Appendix). Each program was observed three times throughout the semester. Each class lasted for approximately 2 hours. The observational data were codified using Excel and classified according to the major themes observed and was analyzed for each program, which will allow us to interpret some of the results of the discipline-specific language tests by relating them to the teaching practices observed.

#### **4.4 Data collection and data analysis**

The data were collected at the beginning and the end of the fall semester in 2019 under the approval of the UAB Ethics Committee on Animal and Human Experimentation (CEEAH- 4728). All the participants signed a consent form at both pre and post data collection phases. Students were given the discipline-specific language test and the English proficiency test together, and the test duration was 1 hour and 30 minutes. The researcher and another teacher supervised the tests.

The data was transcribed and coded in Excel and then transferred to SPSS23. Two raters coded the writings according to task achievement, discipline-related vocabulary and general vocabulary. Cohen’s weighted Kappa was run as a measure of interrater reliability. There was substantial agreement between the two raters in the pre-test and post-test International Trade data,  $\kappa_w = .767$  (95% CI, .726 to .829),  $p < .001$ ;  $\kappa_w = .782$  (95% CI, .742 to .821),  $p < .001$ . Almost perfect agreement was found between the two raters in the pre-test and post-test Film Production data,  $\kappa_w = .833$  (95% CI, .784 to .882),  $p < .001$ ;  $\kappa_w = .834$  (95% CI, .794 to .874),  $p < .001$ . Within-group Wilcoxon signed-rank tests were used to explore pre to post gains for each variable examined and Mann-Whitney U tests were run to compare the gains between the two groups.

## 5. Results

### 5.1 Test results

This section will first present within-group comparisons followed by between-group comparisons in relation to productive and receptive vocabulary tests, the writing test and the English proficiency test.

	PV (Productive Vocabulary)/15			RV (Receptive Vocabulary)/15		
	Pre	Post	Gains	Pre	Post	Gains
International Trade (N= 99)	0.34	4.16	3.82	3.58	10.56	6.98
Standard Deviation	0.80	2.98		2.78	3.68	
Film Production (N= 45)	0.27	0.76	0.49	2.40	3.18	0.78
Standard Deviation	0.58	1.15		1.94	1.95	

Table 1 Pre and posttest mean scores and standard deviations of the vocabulary tests in each group.

As can be seen in Table 1, both the International Trade and Film Production made gains in both productive and receptive vocabulary, although the gains were always greater in receptive vocabulary. A Wilcoxon signed-rank test was performed within each of the groups and each of the tests to determine if the gains were significant. The Trade group improved significantly from

pre to post test in both productive ( $Z = -7.870, p < .001$ ) and receptive vocabulary ( $Z = -8.237, p < .001$ ). The Film group also showed significant pre to post test improvement but only on productive vocabulary ( $Z = -2.344, p = .019$ ) and not on receptive vocabulary ( $Z = -1.776, p = .076$ ).

Table 2 Pre and posttest mean scores and standard deviations of the writing test in each group.

	TA (Task Achievement)/9			DV (Discipline-specific Vocabulary)/9			GV (General English Vocabulary)/9		
	Pre	Post	Gains	Pre	Post	Gains	Pre	Post	Gains
International Trade (N=99)	3.32	4.84	1.52	2.87	4.49	1.62	3.17	4.71	1.54
Standard Deviation	1.49	1.63		1.19	1.55		1.31	1.51	
Film Production (N= 45)	2.67	3.49	0.82	2.38	3.49	1.11	2.53	3.51	0.98
Standard Deviation	1.41	2.08		1.27	2.01		1.32	2.04	

Table 2 shows the results of the pre-post writing tests and the scores obtained in the three measures of analysis (i.e. Task Achievement, Discipline-specific vocabulary and General English vocabulary). The two groups showed gains in all three measures. Both groups showed the highest score gains in discipline-specific vocabulary. A Wilcoxon signed-rank test showed significant improvement on the three writing measures, task achievement ( $Z = -5.721, p < .001$ ), discipline-specific vocabulary ( $Z = -6.548, p < .001$ ) and general vocabulary ( $Z = -6.255, p < .001$ ) in the Trade group. In the Film group, significant improvement was also found in task achievement ( $Z = -2.395, p = .017$ ), discipline-specific vocabulary ( $Z = -3.327, p = .001$ ) and general vocabulary ( $Z = -2.962, p = .003$ )

	GEP (General English Proficiency)/50		
	Pre	Post	Gains
International Trade (N= 99)	33.21	33.57	0.36
Standard Deviation	6.03	5.45	
Film Production (N= 45)	25.67	23.33	-2.34
Standard Deviation	5.82	5.74	

Table 3 Descriptive statistics within-groups (English placement tests)

As regards General English Proficiency, Table 3 shows that the International Trade group performed almost the same in the two tests, namely 33.21 and 33.57 out of 50, thus showing no significant difference ( $Z = -0.226, p = .821$ ). However, the Film Production group shows a significant decrease from 25.67 in the pretest to 23.33 in the posttest ( $Z = -2.253, p = .024$ ). Besides, the

International Trade students obtained higher scores than the Film Production students, which indicates that the former had an averagely higher English level than the latter. Figure 1 illustrates the pre and post test scores in each category and group.

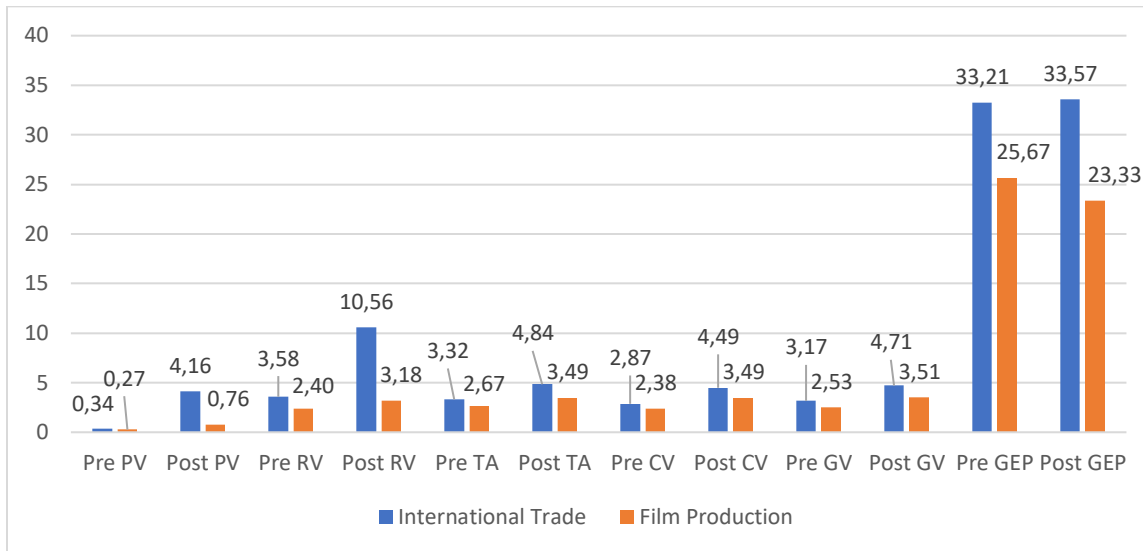


Figure 1 Comparison of pre and post scores

In order to explore potential differences between the two disciplines analyzed, the pre to post gain scores were compared between groups for each of the tests and measures examined. Table 4 and Figure 2 show the International Trade group had higher gains in all the measures in the tests. A Mann-Whitney U test was run to determine if these differences in gains between the two groups were significant. A significant difference was found in the productive vocabulary test ( $U= 739.000, p < .001$ ) and the receptive vocabulary test ( $U= 617.500, p < .001$ ) in favor of the Trade group. No other significant differences were observed between the gains in the two groups.

	PV Gains	RV Gains	TA Gains	DV Gains	GV Gains	GEP Gains
International Trade	3.82	6.98	1.52	1.62	1.54	0.36
Film Production	0.49	0.78	0.82	1.11	0.98	-2.34

Table 4 Gain scores per group and category

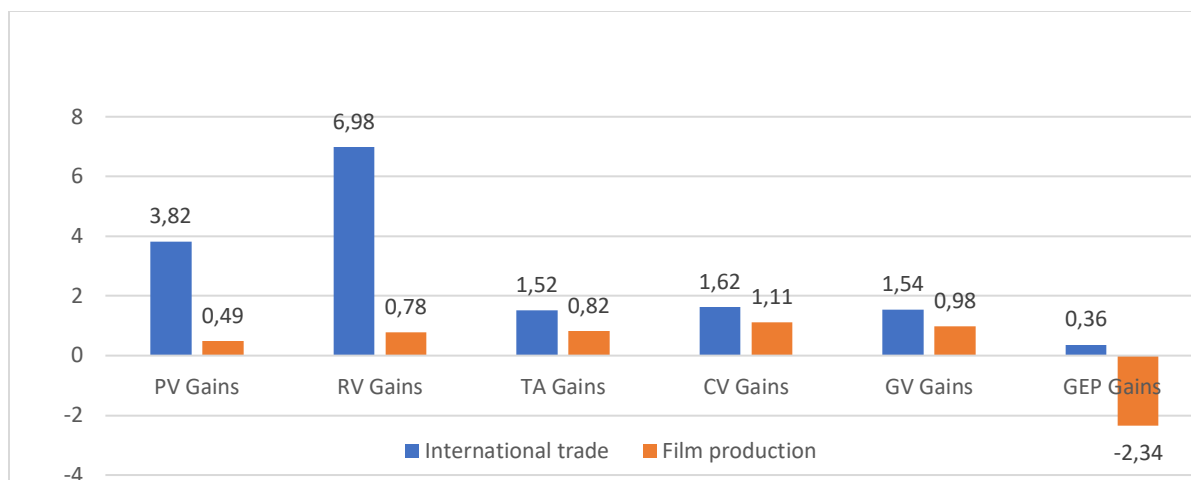


Figure 2 Comparison of gain scores between groups

In sum, the International Trade group made significant gains in all categories except for English placement tests, and the most significant gains were in receptive vocabulary. The Film Production group made significant gains in all categories except for receptive vocabulary and English placement tests, where there was a significant decrease. Comparing score gains between the two groups, the International Trade group made more significant progress in productive and receptive vocabulary tests, especially in the receptive vocabulary test. No differences were found between the gains of the groups in relation to writing measures, namely task achievement, discipline-specific vocabulary and general English vocabulary or in relation to general English proficiency.

## 5.2 Classroom observations

Classroom observation results were drawn from field notes and the checklist mentioned in section 4.3.3. As regards *language use in the class*, the two EMI teachers delivered the subjects exclusively in English. However, in the class of Film Production, a student assistant was interpreting simultaneously to Chinese, whereas this was not the case for the Trade class. Students used Chinese to interact with each other in both groups. As for student-teacher interaction, students from the Trade class had to speak in English, whereas students from the Film class spoke either in English or Chinese as the student assistant could help to interpret. In relation to the *teaching objectives and lesson plans*, the two teachers both focused on content teaching and had no language objectives in their planned lessons. As for *Content presentation and activities and Students' and teachers' interactions*, the two classes were teacher-centered lectures, which gave limited opportunities for students to interact in classes. However, the Trade class offered more opportunities for interaction than the Film class. In the two cases, class materials included PowerPoint presentations and short videos, and those were the major tools to teach key concepts. Yet the Trade class also used a bilingual textbook, and students were provided with Chinese translations for the key terms on the PowerPoint presentations whereas

this was not the case in the Film Production class. Also, in the Trade class, there were more discussion activities among peers or between teacher and students. Many questions were responded to in Chinese and interpreted with the help of the student assistant in the Film Production group. In terms of *Classroom atmosphere*, students' participation in the Trade class was more active than in the Film one. *Language scaffolding in the class* was more present in the Trade group where the teacher gave explanations, used simple words, and asked inspiring questions to facilitate students' comprehension. Also, the teacher slowed down his speaking rate. In contrast, the Film Production teacher did not pay much attention to language aspects as the interpreter would simultaneously interpret to Chinese. Finally, regarding the *linguistic skills used for in-class tasks*, listening skills were the most widely practiced in the two cases, at the expense of speaking and reading, which were done mostly individually. Writing skills were developed in the Trade class when students did writing exercises, whereas it was not observed in the Film class. As for homework, both classes gave written tasks, such as Film scripts or Trade marketing plans. All tasks were in English and were assigned several times during the semester, but crucially, the teachers did not correct students' written homework and only gave general feedback by offering standard sample answers.

## 6. Discussion

Our first research question addressed the extent to which EMI students in the International Trade and the Film Production groups improved their discipline-specific receptive and productive vocabulary after one semester. Students in both groups improved the two types of vocabulary but the gains were generally greater in receptive vocabulary. Significant improvement was observed in the Trade group in both productive and receptive vocabulary, while the Film group only improved significantly in the productive vocabulary test. Previous research shows that receptive vocabulary tends to take less to develop than productive vocabulary, particularly during limited periods of time. The learning of vocabulary is a continuum which is typically seen as starting with receptive knowledge and proceeds to its productive use after intensive practice (Webb and Nation, 2017; Zhou, 2010). The students' vocabulary was expected to improve as that was what had been most widely worked on in the EMI classes through the teachers' explanations and the assigned readings. Even when there was little or no explicit language attention, students were exposed to teaching materials, which might surely foster exposure to and receptive learning of the discipline-specific lexical items.

The second research question analyzed the extent to which EMI students improved their writing skills over the semester. Both groups showed significant gains in their writing skills in the three measures, namely task achievement, discipline-specific vocabulary and general English vocabulary. The highest gains obtained by the two groups were in discipline-specific vocabulary, in line with the gains in vocabulary learning reported above and indicating that the kind of language that specifically benefits in EMI environments is the language related to the discipline being taught. This finding corroborates the claim that it is advisable to include discipline-related

academic literacy in test design (Dafouz et al., 2014). Our students' general writing improvement is also in line with previous studies which have generated overall positive language learning outcomes in Asian as well as European contexts (Aguilar & Muñoz, 2014; Hernández-Nanclares & Jiménez-Muñoz, 2017; Li, 2017; Rogier, 2012; Yang, 2015), although these studies comprised longer periods of time and did not focus on discipline-specific language. Besides, the fact that students also made significant progress regarding task achievement (i.e. providing relevant content in their essays) in the writing tests might suggest that they acquired content knowledge through the EMI semester. This corroborates previous claims that EMI does not hinder students' content learning, also in a variety of EMI contexts (Dafouz & Camacho-Miñano, 2016; Dafouz et al., 2014; Guo et al., 2018; Hernández-Nanclares & Jiménez-Muñoz, 2017; Yang et al., 2019).

Classroom observational data also gives support to the claim that the teaching practices that were common in both groups may have led to students' progress in discipline-specific vocabulary and writing skills. As was seen in section 5.2, the two lecturers both used presentations as the major tool to specifically present content vocabulary, specific terminology, and texts in English. Short videos were also used to illustrate the concepts. Also, students from the two groups had to write short texts on content-related issues in English for homework. Discussion activities in English also happened in the two classes but, more often in the International Trade class than in the Film one.

As regards the extent to which EMI students improved their general English proficiency, it came as no surprise that such a limited amount of exposure (i.e. 32 hours) would not yield any differences. The International Trade group's proficiency score remained almost the same at the pre and posttest data collection times. In contrast, the Film Production group displayed a significant decrease at the end of the semester. This coincides with the EMI studies in the PRC by Guo et al. (2018) and Lei and Hu (2014), which found that EMI was not effective in improving students' general English proficiency, and pointed out that standard English exams might fail to assess the language targeted in EMI classes. Likewise, a study by Ament and Pérez-Vidal (2015) that examined students' linguistic learning outcomes in a Catalan university also found that general language proficiency is not specifically enhanced by EMI in short teaching periods. Additionally, the type of language that is used and practiced in EMI contexts is commonly related to the discipline studied and, although it includes general vocabulary and varied grammatical structures, the fact that EMI lessons do not typically focus on language makes it complex and unrealistic for general proficiency to increase after just one semester.

Our last research question addressed any potential differences between the two disciplines analyzed. Although both the Film Production and International Trade groups showed gains in the vocabulary and writing tests, the Trade group obtained greater gains than the Film group in all measured categories. Yet only in the receptive and productive tasks were significant differences found between the gains of the two groups. These results might suggest that the Trade group benefited more from EMI than its Film counterpart as regards discipline-specific language learning. Classroom observations results might provide an explanation to these results in relation



to the amount of EMI used in the two programs, the presence or absence of language and content integration in classroom practice, and the students' prior English proficiency. First, while the two programs were exclusively taught in English by the lecturers, there was a student assistant interpreting from English to Chinese in the Film class. This happened in approximately 40% of the class time in the observed sessions, which suggests that students from the Film program did not get full exposure to English when in class. Second, the Trade lecturer paid more attention to students' language issues in his teaching practice, and offered scaffolding to students, while this was not the case in the Film class. It might be the case that since those students from the Film group could resort to the student assistant, they might have made fewer efforts to understand and learn the new vocabulary and expressions. Specifically, the scaffolding strategies that the Trade lecturer employed included implicit explanations, elicitation, repetition, slowing down, using simpler words/phrases, and paraphrasing. He was sensitive to students' comprehension problems and made efforts to integrate language support while lecturing, which appears to be crucial to enhance language integrated learning in content classes (Seah & Silver, 2020). The Film Lecturer, however, only focused on delivering content but did not deal with language issues as it was more natural for him to turn to the student assistant for help. Besides, students' participation in discussing or answering questions in the Trade class was more active, and they used English with their teacher. In contrast, students in the Film class could either choose to speak in Chinese or English with the teacher. Additionally, there were more written materials used in the Trade class as students had a bilingual textbook to refer to, and students did a number of writing exercises in the Trade class. Furthermore, class notes offered a Chinese translation for the key terms in the Trade class. What is more, according to the results of the English placement tests, the Trade group had a higher pre-test English level (33.21/50) than the Film group (25.57/50). This might have also been a factor that played a role in students' language and content learning outcomes. This is in line with Yang (2015), who found that pre-test English proficiency affected content achievement at the initial stages over one semester. Furthermore, students' motivation and their more active participation in the Trade group might also explain the differences found. Students from the Trade program were more active in participating in discussions and answering questions, whereas the Film students were more passive.

## **7. Conclusion and Implications**

In comparison with other European countries, EMI programs in East Asia are more driven by policy-level language learning goals (Galloway et al., 2020). More specifically in the PRC, language learning was explicitly set to be promoted in undergraduate education (MOE, 2001). Internationalization is naturally behind the implementation of EMI programs in Chinese HEIs, but improving students' English ability has become a great driven force as well. This study has attempted to shed some light on whether and to what extent, EMI programs in the PRC might be effective in improving students' discipline-specific language learning outcomes. Our data suggests that a larger amount of EMI used in class, more language attention paid by the lecturer,

and higher prior English proficiency are essential factors that might ensure a greater success of EMI programs in relation to discipline-specific language learning. General language proficiency has been shown not to be affected by a short EMI teaching period.

A number of specific implications of this study can be drawn, which might be applicable in the PRC HEIs and elsewhere. In terms of the need to attend to language form in class, first, more explicit vocabulary and writing teaching techniques could be incorporated in EMI teaching, for example, employing activities where students can practice content vocabulary (i.e. oral or written tasks to answer content questions). Second, providing students with written materials and language scaffolding could ensure the comprehensibility of the lectures. Otherwise, students may not be able to comprehend and master the content taught in class. Specifically, offering translations for content vocabulary and adopting a bilingual textbook that students can turn to for self-review might be desirable. Third, teachers may want to encourage students to use English to interact in class, that is, they could, at least, advise or even require students to speak in English when asking or answering questions. If students perceive using English is only optional, they would simply skip the challenge and speak in their first language, and consequently, they may hardly improve their language skills in EMI lessons. Therefore, even in cases where there is an assistant interpreter, it is probably more helpful that EMI teachers encourage students to use English as the only interacting class language. EMI teachers are supposed to also pay attention to students' language difficulties and make every effort to facilitate their comprehension and not only wait for the language assistant to do so.

In terms of institutional policy, it would be advisable to ensure that students reach a certain level of English before entering EMI programs. As is supported by our findings, students' prior English proficiency had an impact on their discipline-specific language learning outcomes. That is, even if it was only a short period of time, the group with a higher English level showed more significant discipline-specific language gains. As for more specific measurements, apart from standard English tests such as IELTS and TOEFL, quick placement tests may also be a good option for universities, particularly when they look for a more convenient and easier way of assessing students' English proficiency. Besides, providing more intensive English language or EAP (English for Academic Purposes) courses could also help enhance students' English ability, and these may be offered both before and after enrolling in EMI programs. Moreover, the usefulness of employing an assistant interpreter may not be guaranteed if universities mechanically place him/her in an EMI class without clarifying his/her role. We believe that assistant interpreters are only supposed to facilitate communications occasionally, instead of dominating EMI classes. That is, they should only offer language help when needed rather than interpret the whole lesson, otherwise, students probably will not make an effort to listen to the lecture but naturally turn to the interpreters' help. Similarly, if assistants interpreted the whole lesson, EMI teachers would not pay attention to language and consequently, students' language learning would also be hindered.

We should acknowledge a number of limitations. First, our study assessed students' language learning outcomes only over a short period of time, thus further research is needed to validate students' language learning outcomes over longer periods of time. Second, other language skills (speaking, listening, and reading) were not specifically studied, and even though we touched upon writing skills, they were not the main focus of the study but were only used to assess vocabulary learning. Likewise, content knowledge was not specifically examined but only analyzed through task achievement. Therefore, future research should assess language and content learning outcomes from a more comprehensive perspective. Additionally, our findings need to be interpreted with great caution and point to the need to pay more attention to discipline-based differences.

In conclusion, this study has contributed new data to the existing research on EMI in the PRC. It has corroborated the need to have discipline-specific language tests to be able to measure outcomes, has confirmed the need to explore various EMI disciplines and to attend to language in class and has set the need to further analyze the role of the assistant interpreters in EMI programs.

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## Appendix

### English Medium Instruction (EMI) Classroom Observation Checklist (adapted from Fortune, 2000; Wewer, 2017)

Class:

Topic:

Instructor:

Number of students:

Observer:

Date:

Class hour:

Student grade and major:

Teacher's nationality:

University:

	4 Excellent	3 Good	2 Fair	1 Not Observed	Comments
<b>1 Language use in the class</b>					
English was the only instructional language in the class (if not, the teacher used Chinese)					
Chinese was used to give a word-for-word translation (if not, to give a further/alternative explanation)					
The instructor used the target language appropriately and effectively					
Students used English in the class to interact with teachers					
Students used English in the class to interact with peers					
Teacher's classroom discourse features heavy technical and subject-specific sentence structures but few discourse markers.					

When/how/why teacher used Chinese?					
When/how/why students used Chinese (L1)?					
<b>2 Teaching objectives &amp; lesson plan</b>					
The instructor had a clearly discernible lesson plan.					
The instructor explicitly introduced the class's content objectives.					
The instructor explicitly introduced the class' language objectives.					
Involved explicit linguistic terms/vocabulary teaching.					
<b>3 Content presentation &amp; activities</b>					
Presenting the content in a structured and clear way					
The activities/exercises chosen to achieve the objectives were effective					
The time allotted for activities was appropriate					
The amount of teacher talk and student talk were appropriate during the whole class.					
The type and amount of teacher feedback was effective					
Some teaching materials were used (textbook, video, ppt, etc.)					
<b>4 Language scaffolding in the class</b>					
The teacher scaffolded on linguistic structure.					
The teacher scaffolded the students' comprehension.					
The teacher scaffolded students' language production.					



The teacher dealt with language issues explicitly.					
The teacher dealt with language issues implicitly.					
There was explicit language corrective feedback in the class.					
There was inexplicit language corrective feedback in the class.					
<b>5 Interaction: students &amp; teachers</b>					
The use of small groups/pair work during each activity					
All students had opportunities to speak in class (either with teacher or peers)					
Many students interacted with the teacher by asking or answering questions					
<b>6 Classroom atmosphere</b>					
Student participation was active and lively					
The class atmosphere was warm, open and accepting.					
The instructor was sensitive to students' difficulties and abilities.					
<b>7 Used linguistic skills for in-class tasks</b>					
Writing was involved in student's in-class tasks.					
Reading was involved in student's in-class tasks.					
Listening was involved in student's in-class tasks.					
Speaking was involved in student's in-class tasks.					

