

# High school to university transitional challenges in English Medium Instruction in Japan

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## **Abstract:**

Despite the rapid expansion of English-medium instruction (EMI) at higher education institutions around the world, little research has explored the language-related challenges faced by students when entering an EMI university from a first language (L1) medium high school. This study identifies challenges posed by the school–university transition encountered by L1 Japanese undergraduates who study academic subjects through English at a university in Tokyo. 103 students from various academic disciplines completed questionnaires on academic English challenges in addition to receptive and productive academic vocabulary size tests as a measure of their linguistic preparedness for academic study in English. Semi-structured interviews were subsequently conducted with 20 students. Results show that students who attended Japanese medium high schools where English language classes were taught through English obtained a larger academic vocabulary size and encountered fewer linguistic challenges adjusting to English-medium learning than their counterparts who had studied English through Japanese. This suggests that even ‘soft-EMI’ high school experiences may lead to an easier transition to university-level EMI contexts. Based on the findings, implications are discussed in terms of the design of EAP (English for Academic Purposes) curricula with a specific focus on vocabulary learning for EMI university students across a range of English language levels.

## **Keywords:**

Japan; EMI; internationalisation; English language; vocabulary; English for Academic Purposes (EAP)

## **Word Length:**

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## **1. Introduction:**

One of the most prominent higher education (HE) trends in the twenty-first century has been the rapid expansion of EMI programs in non-Anglophone countries. HE institutions in Japan are no exception to this trend, seeing English as a means to internationalise the curriculum and cultivate local students with requisite skills to participate in an international professional community. A recent string of HE initiatives by Japan’s Ministry of Education (MEXT) has aimed to increase EMI courses at Japanese universities. Despite the rapid expansion of EMI, an increasing number of studies have shown that L2 English students encounter linguistic challenges when adapting to an English-only environment due to their inadequate linguistic skills (e.g. Bradford, 2018; Galloway & Ruegg, 2020). Some EMI studies (e.g. Evans & Morrison, 2011) have pointed to students’ high school background and a lack of academic vocabulary knowledge being a substantial source of difficulty for EMI students. However, to date, little research has been conducted to

explore the relationship between students' previous EMI experiences, transitional challenges and vocabulary size, except for a series of studies in the context of Hong Kong (Lin & Morrison, 2010; Evans & Morrison, 2011). Conventionally, research exploring this relationship has mainly adopted self-report instruments examining participants' perceptions (Macaro, Curle, Pun, An & Dearden, 2018). Academic vocabulary knowledge has seldom been directly measured in EMI research using established vocabulary tests. Therefore, this study fills this gap by examining the academic vocabulary size and linguistic challenges of EMI students at a university in Japan, and analysed in relation to their previous EMI experiences in high school. Students' receptive and productive vocabulary size as well as their reported language-related challenges pertaining to reading, listening, writing, and speaking were measured. As previous research in Hong Kong has shown a link between English medium instruction in high-school and greater vocabulary development (Lo & Murphy, 2010), data on students' high school background were collected, to compare students whose high schools taught English language classes through the medium of English versus through the medium of Japanese. Due to a lower number of EMI high schools in Japan compared to Hong Kong (MEXT, 2018a), this analysis sought to investigate whether 'soft EMI' experiences (that is the learning of language related content through English) can lessen transitional challenges experienced when undertaking an EMI study for the first time.

## **2. Background to the study:**

The key constructs of the study surround issues of: transition from high school to EMI university studies; academic language-related challenges in EMI; and the role of academic vocabulary knowledge in EMI. Background research in each of these three key areas is briefly reviewed in this section, before we examine contextual issues associated with EMI provision in Japanese universities.

### *2.1 Transition from L1 high school to EMI in higher education*

Transitional studies explore the challenges encountered by students associated with transition from school to university (McInnis, 2001). Prior to the 1990s, transitional studies almost exclusively focused on the investigation of academic challenges experienced by domestic students in English speaking countries. However, due to increased numbers of international students at Anglophone universities over the last two decades, the investigation of students' challenges has shifted towards challenges faced by second language (L2) English international undergraduates (e.g. Andrade, 2006; Campbell & Li, 2008). Consequently, more recent enquiries have explored challenges faced by both domestic and international students (Ramsay, Jones & Barker, 2007). These studies suggest that this transition for international students poses similar

challenges to that of their local student counterparts, but their difficulties mainly stem from limitations in English language proficiency (Andrade, 2009). Thus far, studies exploring the language-related challenges experienced during transition from schools to universities have predominantly been conducted in Anglophone countries (Murray, 2012), except for a limited number of studies (e.g. Macaro et al., 2019; McMullen, 2014; Sultana, 2014) which were conducted in EMI contexts 'where the first language of the majority of the population is not English' (Macaro et al., 2018, p. 37). This highlights a need for further studies extending the analysis to such contexts.

## *2.2 Academic language-related challenges in transition to EMI*

Numerous studies have highlighted the academic language related challenges experience by students when studying in an EMI context. These have highlighted challenges surrounding academic tasks such as listening to the lecturer with an unfamiliar accent (Hellekjær, 2010); giving oral presentations and taking part in seminar discussions (Kırkgoz, 2005); and reading textbooks that contain unfamiliar words (Andrade, 2006). In one of the largest studies in this area, Evans and Morrison (2011) conducted a three-year longitudinal study following the trajectory of EMI undergraduates in Hong Kong and identifying their transitional challenges via questionnaires (n=3000) and semi-structured interviews (n=28). The study indicated that undergraduates expressed great difficulties associated with vocabulary, claiming that 'this lack of vocabulary knowledge seriously impeded their comprehension of lectures and textbooks, and inhibited the communication of ideas in papers and presentations.' (p. 206). This finding points to the important role that vocabulary knowledge plays in terms of preparedness to undertake study in an EMI context.

## *2.3 Academic vocabulary knowledge*

In addition to students' high school background, academic vocabulary knowledge is a variable of interest in this study. A number of studies have been conducted to establish academic lists of vocabulary required for educational purposes in an attempt to help L2 learners acquire the right vocabulary for their university studies (Hyland & Tse, 2007). Coxhead's (2000) Academic Word List (AWL) has been widely adopted and comprises the most widely used 570 academic word families regardless of the fields of academic specialisations for undergraduate degrees. One limitation of academic vocabulary lists, however, is a single inventory might not cover all the potential words used in all the specialised areas of academic studies, and the coverage of specific genres and disciplines remains unclear. Despite this limitation, the AWL has been widely used as a tool to measure learners' vocabulary size in applied linguistics research (e.g. Macaro et al., 2019).

A few EMI studies have included measures of students' vocabulary size (e.g. Harrington & Roche, 2014). Coxhead and Boutorwick (2018) conducted a six year-longitudinal study of EMI high school students' vocabulary development in Germany, claiming that 'little research has been published on vocabulary in EMI overall.' (p. 589). Uchihara and Harada (2019) similarly emphasise a need for further vocabulary research in Japanese EMI contexts by investigating the relationship between EMI students' vocabulary knowledge and self-perceptions of the four language skills. One of the most seminal pieces of research was conducted by Lin and Morrison (2010) in Hong Kong, who demonstrated the relationship between challenges faced by university students and academic vocabulary size (n=762). The results of the vocabulary size test showed that only 1.4% of students from Chinese medium instruction (CMI) high schools achieved the 'satisfactory level' of productive vocabulary knowledge, suggesting that almost all CMI students (98.6%) had an insufficient productive vocabulary knowledge (p. 259). Their evidence suggests that these students would have experienced difficulties in comprehending lectures and coping with prerequisite assignments. Although the study successfully demonstrated that students' vocabulary size served as a predictor for students' linguistic challenges, it did not investigate how insufficient vocabulary knowledge would affect student learning. Harrington and Roche (2014) also explored the relationship between vocabulary size and overall academic achievement measured by GPAs of Arabic L1 EMI university students (N=70) in Oman. Their bivariate correlation analysis suggests that the vocabulary size (measured by basic word accuracy) and GPAs had a moderately strong correlation coefficient at  $r=.34$ ,  $p<.05$  (p. 10), indicating that vocabulary size is associated with overall academic achievement.

#### *2.4 Transition from high schools to EMI universities in Japan*

Traditionally, the medium of instruction for high school English language classes has been Japanese (Steele & Zhang, 2016). The most significant reason is that there is a high demand for high school students to prepare for university entrance examinations (Murphey, 2004). Central to this objective of exam preparation, teaching methods have centred around the grammar translation method leading to students' low communicative competence, and anxiety to use English practically (Kikuchi & Browne, 2009). Consequently, there are growing concerns that the demands of EMI have increased without adequate plans to support students from Japanese-based high school systems (Bradford, 2013).

When transitioning into EMI universities, one crucial factor to consider is students' prior experience of learning through English, given that their challenges posed by the school–university transition vary according to background (Galloway & Ruegg, 2020). Evans and Morrison (2011) found that the most

significant factor influencing adjustment to EMI universities is the high school teaching medium. In their study, students from the Chinese-medium high school system expressed a considerably more onerous induction into EMI than their counterparts from EMI high schools. The context of Japan is vastly different to Hong Kong, in that only a very small proportion of high schools in Japan offer full EMI at a high school level (MEXT, 2018a). Within this context, the majority of students do not even learn English through English, and thus the transition for these students to learn content through English may be all the more difficult, having had no experience of instructional content in English previously. According to MEXT (2018b), schools offering English mediated high school English classes are often funded by the recent government's initiatives, such as the five-year policy, Super Global High Schools (SGH), offering 123 schools annual funding (JP¥843m, US\$7m in 2018b), and Super Science High Schools (SSH), funding 212 schools (JP¥2,219m, US\$20m in 2019) (MEXT, 2019) with the aim to “foster global leaders who can succeed internationally in the future” (p. 1). As such, graduates of these schools with extra English language support through presentations, debate and fieldwork may be more favourably disposed towards EMI than their counterparts who learned through Japanese, underpinning the motivation of the current study to examine the high school teaching medium as a variable affecting challenges experienced at an EMI university.

Japanese HE makes for a desirable research context to explore challenges associated with a transition to EMI for several reasons:

1. The recent top-down EMI policy in Japan is indicative of those in numerous other contexts where English is not widely used in other segments of society, and thus the findings may be relevant to similar contexts in East Asia and South East Asia. For example, Galloway, Numajiri and Rees (2020) conducted a comparative study in Japan and China to suggest the transferability of their findings across different EMI contexts.
2. Unlike Anglophone nations, which have been the predominant contexts of transition research, a Japanese context allows for an exploration of language-related challenges associated with the recent Englishisation of HE.
3. Japan allows a comparison of the findings of the previous transitional studies in a broader EMI context where a transition of medium of instruction between high school and university has little historical presence, and thus may have implications for language curriculum planning in emerging EMI programs.

Japanese HE has also been the focus of recent EMI research (e.g. Authors, AAAA; Bradford, 2018; Bradford & Brown, 2018; Author and Other, BBBB; Uchihara & Harada, 2018), and thus our study aims to situate itself within this growing body of empirical literature.

### **3. The study:**

#### *3.1 Research questions*

In conjunction with the literature set out above, the following research questions have been devised to examine university students' high school background, transitional challenges and vocabulary knowledge:

1. Do EMI university students experience their perceived language-related challenges differently depending on their teaching medium for high school English language classes?
2. What is the receptive and productive vocabulary size of the students?
3. What is the relationship, if any, among the students' English proficiency, language-related challenges and academic vocabulary size?

#### *3.2 Settings and participants*

The study was conducted at a single university in Tokyo to minimise institutional differences in the data. This university, located in the greater Tokyo metropolitan area, was purposively selected for the following reasons:

1. It was identified by Author and Other (BBBB) as a university that emphasised the admission of September entry students, and thus offered potential to explore students from English based high school systems.
2. The university has a strong tradition of bilingual education, offering a number of EMI courses in a range of academic fields.
3. Students across the entire university must take at least nine units of EMI courses (i.e. three modules) as a part of their graduation requirement. Previous research conducted at another university in Japan (McKinley, 2018) had indicated variability between the quality and delivery of EMI classes within the same university, but due to the EMI course requirement for all students, this university provides uniform and consistent EMI provision.

After receiving a description of the research through a participant information statement, a total of 107 students from a range of academic disciplines voluntarily participated in the questionnaire and vocabulary size test after excluding students whose L1 was English. Missing data from four individuals (instances of

incomplete surveys) resulted in final number of 103 participants, involving EME students (n=47) and JME students (n=56) (see Table 1).

**Table 1: Information of the participants (n=103)**

Language of instruction			Academic discipline			Year			English proficiency		
EME	47	45.6%	Social Science	46	44.7%	1	43	41.8%	A2	36	35.0%
JME	56	54.4%	Humanity	37	35.9%	2	31	30.1%	B1	31	30.1%
-	-		Natural Science	20	19.4%	3	29	28.1%	B2	26	25.2%
-	-		-	-		-	-		C1	10	9.7%

To select interview participants, a maximal variation sampling strategy was adopted, which 'only investigates a few cases but those which are as different as possible to disclose the range of variation in the field' (Flick 2009, p. 123). Students were sampled to include a range of those who studied English medium English (EME) or Japanese medium English (JME) at high schools (i.e. teaching medium for high school English language classes). The sampling strategy also deemed *language proficiency* and *year level* as important variables affecting students' EMI experiences. As previous EMI research has shown high school EMI-background advantages in Hong Kong to dissipate over years of instruction (Evans & Morrison, 2011), the sample also included students in their second and third years which helps to ensure we captured challenges across year levels. The study purposively selected ten EME and ten JME students from Years 1-3 and proficiency levels A2 to C1 as individual cases that would offer the broadest picture. Table 2 presents the selected cases, with numbers replacing participants' names.

**Table 2: Information of EME and JME interview participants (source: student interviews)**

Participants	Instruction at high school	Year	Study abroad	Gender	Proficiency (CEFR)*	Major
1	EME	1	No	Female	A2	Linguistics
2	EME	1	No	Female	B1	Anthropology
3	EME	1	No	Female	B2	undecided
4	EME	1	US from 10-14	Female	C1	Biology
5	EME	1	No	Female	A2	Business
6	EME	2	No	Male	B2	Business
7	EME	2	US from 14-18	Female	B2	undecided
8	EME	3	Hong Kong from 3-5	Male	B1	Economics
9	EME	3	No	Female	A2	Linguistics
10	EME	3	Singapore from 6-18	Male	C1	Sociology
11	JME	1	No	Female	A2	Economics
12	JME	1	No	Male	A2	Education
13	JME	1	No	Male	B2	undecided
14	JME	1	No	Male	A2	Education
15	JME	2	US from 6-12	Male	C1	undecided
16	JME	2	No	Female	A2	undecided
17	JME	2	Italy (international	Female	C1	undecided

\* Students self-reported their level of English proficiency on the short-background questionnaire, such as their TOEFL score. TOEFL PBT 600 above (CEFR C1 Levels) = Advanced, 550-600 (CEFR B2 Levels) = Upper-intermediate, 550-450 (CEFR B1 Levels) = Lower-intermediate, 350-450 (CEFR A2 Levels) = Elementary.

			school) from 12-15			
18	JME	2	No	Female	A2	Psychology
19	JME	3	No	Female	B1	Education
20	JME	3	US from 11-12	Male	B2	International Relations

### 3.3 Data collection

Data collection included the following research instruments and measures: two questionnaires, two vocabulary tests, and semi-structured interviews.

A short background questionnaire was first administered to collect demographic information for selection criteria for use as independent variables in analysis. In addition, all participants took a 45-item questionnaire (see Appendix 1), which was adopted from Evans and Morrison (2011), about their linguistic challenges. The questionnaire centred on four aspects of academic English skills: 15 items for academic writing, and 10 items each for listening, reading and speaking. Students were asked to indicate the degree of difficulty in mastering each item from the four skills in an EMI context by choosing a numbered response on a Likert-scale ranging from 1 (very difficult) to 5 (very easy).

The first vocabulary test was a receptive vocabulary test that adopted the AWL section used in Schmitt's Vocabulary Levels Test (VLT) (Schmitt, Schmitt & Clapham, 2001) and the New VLT (McLean, Kramer & Beglar, 2015) which both adopted the same 30 items from the AWL (Coxhead, 2000). The VLT comprises of simple tasks to assess learners' receptive vocabulary knowledge by measuring their performance in word-definition matching tasks. An example of the academic vocabulary test of the VLT is shown below:

- 1 element      \_\_\_\_\_ money for a special purpose
- 2 fund
- 3 layer      \_\_\_\_\_ skilled way of doing something
- 4 philosophy
- 5 proportion      \_\_\_\_\_ study of the meaning of life
- 6 technique

To measure students' productive vocabulary size, we adopted Laufer and Nation's productive version of Vocabulary Levels Test (PVLT) (1999). The PVLT consists of 18 items tested at five different frequency levels, using the same lexical items as ones employed in the receptive test. In the current study, we only administered the academic section of the PVLT; the lexical source for its academic vocabulary was based on the University Word List (Xue & Nation, 1984). The participants were asked to fill in the blank to complete the words in sentences by adding missing letters, as in the example below:



There has been a recent tr among prosperous families toward a smaller number of children.

<trend>

The current study adopted the academic section of the vocabulary size tests (i.e. the AWL in the receptive test and the UWL in the productive test) since receptive and productive tests assess 'separate slices of a learner's vocabulary' (Nation & Beglar, 2007, p.10), and participants' performance at each level (e.g. the 3,000-word level) can be examined separately. The lexical source (i.e. the UWL and AWL) was also based on the different word lists for the receptive and productive tests since the UWL and the AWL are still comparable. Coxhead (2000) for example asserts that 51% of the word families included in these two lists are same. Tschirner (2004) also confirmed the comparability of these two vocabulary tests by comparing the results of the two tests. Tschirner measured the academic vocabulary size of the same group of students, using the two tests, concluding that both tests lead to equivalent results. Both tests were designed to assess vocabulary knowledge with the minimum ability of contextual text comprehension. As a benchmark, Hu and Nation (2000) claim that a L2 reader is required to understand at least 98% of the words used in a text to adequately comprehend the text.

Finally, semi-structured interviews involving 10 EME and JME students were deployed to examine students' challenges associated with academic English (see Appendix 2 for the interview protocol). The results were used to complement the questionnaire data. These also filled the noted gap in Lin and Morrison (2011), which called for interviews as an alternative method to elicit data regarding students' linguistic challenges. Interviews were conducted entirely in Japanese to ensure language did not hinder the reliability of the data. All of the interviews lasted for 20-25 minutes, and were recorded with an audio recorder.

### *3.4 Procedure and analysis*

While the challenge questionnaire was previously tested for its constructs by Evan and Morrison (2011), its internal reliability in our questionnaire was tested. Cronbach's alpha showed the questionnaire to reach acceptable reliability,  $\alpha=.927$  (writing);  $\alpha=.912$  (reading);  $\alpha=.928$  (speaking); and  $\alpha=.901$  (listening), all exceeding .70 coefficient of appropriate reliability (Dörnyei, 2007). The normality of the data was tested by the numerical, formal tests, a Shapiro-Wilk and Kolmogorov-Smirnov and its skewness value and normal distribution curve. The questionnaire and vocabulary tests yielded ordinal data and interval data, respectively. Because the data were not normally distributed, non-parametric tests were used. To compare scores between two different independent groups, the data were analysed using the Mann-Whitney U-test (with one between-subjects variable). In addition, the Spearman's correlation coefficient (non-parametric analysis) was used for the final research questions that explored relationships between student variables

(Field, 2018). This test was appropriate since the variables were ordinal (the Likert-scale questionnaire and ranked order CEFR level) and interval data (vocabulary test scores). For the qualitative analysis, the first author transcribed the audio-recordings of all 20 interviews in verbatim Japanese to ensure the transfer of the same meaning, tone and nuance as that of the original language. Excerpts were then translated into English by the same author and checked for its accuracy by the second author for data presentation. As transcripts were to be subjected to content analysis, rather than discourse analysis, the final transcripts did not include translations of discursual features (e.g. overlapping words, repetitions, false starts, or filled pauses). Adopting a content analysis approach through NVivo, main themes were initially created deductively based on the EMI challenges literature and inductively from the raw interview transcripts (Zhang & Wildemuth, 2009). The themes were regularly checked and amended as new themes emerged through the later coding phases to achieve a smaller number of units for further analysis. These cycles highlighted repeated patterns of main and sub themes that were identified from the text related to student academic English problems in the areas of writing, speaking, listening and reading.

#### 4. Results:

##### 4.1 Differences in language-related challenges

The first research question explored differences in language-related challenges between EME and JME students. Each of the mean scores of the four sub-skills on the questionnaire was calculated to form a combined composite mean for the four academic English skills, which followed the practice of Evans and Morrison (2011) (i.e. a mean of means obtained from the items in each of the four skills answered by the 103 students) (see Table 3). The Mann-Whitney U-test with a Bonferroni adjusted alpha level of .013 per test (.05/4) revealed that self-perceived linguistic challenges in all four areas of academic English were significantly different between JME and EME students with a medium to large effect size [writing  $U = 484$ ,  $p < .001$ ,  $r = .54$ ; reading  $U = 346$ ,  $p < .001$ ,  $r = .63$ ; speaking  $U = 288.5$ ,  $p < .001$ ,  $r = .67$ ; listening  $U = 572.5$ ,  $p < .001$ ,  $r = .48$ ]. EME students perceived fewer language-related challenges than JME students. Please note, that in our interpretation of the correlation coefficient as a measure of an effect size, we considered ( $r = .1$ ) is small, ( $r = .3$ ) is medium and ( $r = .5$ ) is large effect (Field, 2018).

**Table 3: Descriptive statistics of challenges between EME and JME students**

	EME students (n=47)			JME students (n=56)		
	M	Md	SD	M	Md	SD
<b>Writing skills</b>	3.50	3.47	.60	2.65	3.03	.80
<b>Reading Skills</b>	3.61	3.70	.60	2.52	2.90	.85
<b>Speaking Skills</b>	3.63	3.80	.64	2.47	2.90	.86

<b>Listening Skills</b>	3.66	3.70	.62	2.78	3.30	.87
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Note 1: Number of participants=103; M=Mean; Md=Median; SD=Standard Deviation

Note 2: The scores for the four English skills ranged from 1 to 5 (1-very difficult, 5-very easy)

Note 3: Median is presented because for non-parametric data sets, it is used as the more reliable measure than mean and standard deviation for the analysis of centre for the distribution of scores (Field, 2018).

Table 4 below shows the descriptive statistics of challenge in each academic skill according to different

years, indicating a possibility that the challenges manifested by the first-year students may dissipate towards more senior years of their university study. To verify this hypothesis, however, a future study would need to follow the same cohort of learners over the period of a degree course and compare challenges according to year level. In our sample, we cautiously conclude that the first year participants were, on average, below the 3-point mid-mark of challenges in all of the four academic skills. This indicates that these students experienced more difficulty than ease towards their EMI studies. This stands in stark contrast to their second and third year counterparts, who were, on average, all over the 3-point mid-mark and started to report greater ease for some of the challenges, especially in the areas of speaking and listening. Thus, by analysing the challenge data based on different years, we see that the students' challenges differ across the stages of their university study.

**Table 4: Descriptive statistics of challenges according to different years (i.e. Year 1, Year 2, Year 3)**

	First year (n=43)			Second year (n=31)			Third year (n=29)		
	M	Md	SD	M	Md	SD	M	Md	SD
<b>Writing skills</b>	2.70	2.73	.72	3.01	3.07	.69	3.16	3.10	.81
<b>Reading Skills</b>	2.70	2.80	.79	3.02	3.12	.71	3.21	3.20	.92
<b>Speaking Skills</b>	2.70	2.50	.91	3.15	3.15	.79	3.23	3.12	.80
<b>Listening Skills</b>	2.87	3.10	.94	3.21	3.20	.70	3.22	3.32	.82

#### 4.2 Types of challenges experienced

While our quantitative data indicated that students perceived challenges differently depending on teaching medium for high school English classes, our qualitative data suggested more detailed benefits of studying English through English in terms of providing them a smoother induction to an EMI university. Despite the weak form of EMI in high school, their earlier exposure to studying English through English appeared to offer students opportunities to familiarise themselves with the tasks required for EMI study (e.g. discussion, presentation, and essay writing), and to deepen their understanding of academic vocabulary required in EMI. Consequently, JME students endured a somewhat more taxing induction into EMI higher education than their EME counterparts.

In terms of academic writing, the interviews findings revealed four main areas of challenges: *slow production speed*; *poor essay organisation skills*; *insufficient vocabulary knowledge*; and *incorrect grammar*. While JME

students (n=6) experienced general difficulties with writing in English, irrespective of genre, EME students (n=8) perceived general English writing easier than academic writing, as illustrated in the excerpts from the following students:

Student 3 (EME, B2): *If it is not academic or technical, I am confident in writing in English well and quickly because my high school English classes were in English where I had to submit assignments in English. If I had to write a long essay using academic essay structures, I'd often have to spend a lot of time on planning.*

Student 12 (JME, A2): *It takes a lot of time to write in English in general and I often make grammatical mistakes. I had never written essays in English before entering the university.*

Although JME and EME students expressed markedly different challenges, all the participants interviewed (n=20) indicated that academic essay writing skills were not only determined by English skills but also good essay planning and structure. For example, Student 4 (EME, C1) explained that "I can speak English well, but organising an essay structure is still challenging. I would like to improve my writing skills during my first year." To echo this, Student 15 (JME, C1) also added that "I take a long time to plan and organise my essay structure because I write differently when writing essays in Japanese." Irrespective of high school teaching medium background, all participants felt that academic writing skills were part of the requirements of university study and should improve during the crucial first year at university.

In terms of academic reading, interrelated challenges faced by our participants were related to *slow processing speed* and *insufficient vocabulary knowledge*. Both groups (n=6 EME, n=10 JME) indicated that inadequate vocabulary knowledge, including general academic and technical terminologies, impeded their reading ability. However, JME students were more acutely aware that their insufficient vocabulary knowledge placed them at a considerable disadvantage, having to stop carrying on reading because they encounter too many unknown words and sentences. For example, Student 19 (JME, B1) claimed "when reading in English, I have to stop after every sentence because there are too many words and English sentence structures that I don't recognise. Similarly, Student 16 (JME, A2) notes "after reading a few lines, I notice there are so many words I don't recognise. I often go back by highlighting them and using a dictionary. This process takes a long time and reading becomes unpleasant."

Compared to other skills, reading appears to be one shared skill that all the participants (n=20) expressed a strong desire to improve, since their assignments in EMI programmes mostly revolve around pre-assigned reading materials, articles and textbooks, as illustrated by the following excerpt:

Student 6 (EME, B2): *I spent a lot of time reading assigned articles and textbooks and we have been given too many to read. I do not have enough time to read everything. I would love to improve my reading skills urgently.*

Academic speaking polarised our participants. JME students who had learned English through Japanese had little to no experience of participating in classes conducted in English. Consequently, all ten of them expressed difficulties with spoken *fluency*, *accuracy* and *vocabulary*. Their vocabulary knowledge was less substantial than their EME counterparts. This lack of vocabulary knowledge severely impeded both their English communication. Conversely, EME students were more confident and willing to speak in English and only four of them perceived speaking to be challenging (e.g. acquiring specialist vocabulary).

*Student 18 (JME, A2): Before university, I didn't have opportunities to practise speaking English. When I speak English, I tend to use formal phrases that I remember from my entrance examinations. I also use Japanese words, 'Eeeeto' or 'Anoo' when I am supposed to only use English. I always feel irritated when having to speak English.*

*Student 6 (EME, B2): Speaking English is generally not challenging because I spoke English a lot through activities like presentations and class discussions in high school English classes. But I find it still difficult to talk about academic topics especially in lectures that are not my area of expertise because I don't know enough vocabulary.*

Finally, the perceived challenges associated with academic listening were *lecture speed*, *accents* and *insufficient vocabulary size*. Being unaccustomed to listening to lengthy stretches of EMI lectures and lacking a rich repertoire of academic vocabulary, JME students (n=9) reported that listening for the entire duration of their lecturers was particularly taxing. Student 18 (JME, A2) commented that "I always stop listening to teachers every time I encounter difficult words. This prevents me from grasping the whole picture of the lectures."

Nevertheless, compared to other skills, listening was deemed less challenging, seeing that instructors in this EMI context were reported to simplify their language according to the level of students' English and content knowledge and students can prepare for their lectures by reading pre-assigned materials.

*Student 5 (EME, A2): When listening to teachers in class, they can rephrase difficult words if we don't understand them. I can also read textbooks before lectures. But, I don't understand lecturers with strong accents.*

*Student 14 (JME, A2): Our teachers generally speak more slowly than how they would normally speak to other native speakers because they know that our English is not good. I don't find academic listening very challenging.*

To conclude, it was found that our participants faced a number of linguistic transitional challenges because of learning through a second language. Some of these challenges were similar to those experienced by L1 English students, including adapting to the new methods of university learning and teaching, such as writing academic essays and delivering presentation. However the severity and number of challenges faced by those who had no prior experience of learning through English in high school was significantly greater—a

finding supported in the qualitative data. The qualitative evidence also highlighted that the EME and JME students' limited vocabulary knowledge was one of the most significant factors that impeded their performance in all of the four academic English skills.

#### 4.3 Receptive and productive vocabulary size

The descriptive statistics of the vocabulary size of two groups are presented in Table 5. A Mann-Whitney U-test with a Bonferroni adjusted alpha level of .025 per test (.05/2) revealed that test scores for both receptive and productive vocabulary size are significantly different between EME and JME students, [receptive  $U = 563.5$ ,  $p < .001$ ,  $r = .49$ ; productive  $U = 467.5$ ,  $p < .001$ ,  $r = .55$ ].

**Table 5. Descriptive statistics for the vocabulary size between JME and EME students**

	EME students (n=47)			JME students (n=56)		
	Mean	Median	SD	Mean	Median	SD
<b>Receptive Vocabulary Size</b>	28.28	28	1.43	26.23	26	2.03
<b>Productive Vocabulary Size</b>	15.19	15	1.68	12.02	12	2.83

Note: Maximum score for the receptive and productive for 30 and 18 respectively.

We next investigated the proportion of EME and JME students who had achieved a vocabulary score deemed at a satisfactory level according to Lin and Morrison (2010). For the receptive test, all the EME students (100%) reached a satisfactory level, while only 91.1% of JME students achieved this level (Table 6). For the productive test (Table 7), the results showed that a majority (89.4%) of EME students reached a satisfactory level, while only 28.6% of JME students met this benchmark. That is to say, more than 70% of JME students lacked a satisfactory productive vocabulary, compared to only 10% of EME students.

**Table 6. Results of the receptive size test (at satisfactory level)**

Number of words known	Percent of words known	EME students (n=47)		JME students (n=56)	
		Frequency	Cumulative percent	Frequency	Cumulative percent
30	100%	11	23.4%	5	8.9%
29	96.9%	11	46.8%	5	17.9%
28	93.9%	12	72.3%	4	25.0%
27	90.0%	9	91.5%	9	41.1%
26	86.6%	2	95.7%	10	58.9%
25	83.3%	1	97.9%	12	80.4%
24	80.0%	1	100.0%	6	91.1%
Total		47		51	

Note: 24 items or higher in the test are considered to be as a satisfactory level (Lin & Morrison, 2010).

**Table 7. Results of the productive size test (at satisfactory level)**

Number of words known	Percent of words known	EME students (n=47)		JME students (n=56)	
		Frequency	Cumulative percent	Frequency	Cumulative percent
18	100%	5	10.6%	1	1.8%
17	94.4%	5	21.3%	1	3.6%

16	88.9%	8	38.3%	5	12.5%
15	83.3%	15	70.2%	6	23.2%
14	77.6%	9	89.4%	3	28.6%
Total		42		16	

Note: 14 items or higher in the test are considered to be as a satisfactory level (Lin & Morrison, 2010).

#### 4.4 Relationship of English proficiency, vocabulary size and challenges

A Spearman's rank-order correlation showed that there was a strong and positive correlation between English proficiency, receptive and productive vocabulary size test scores and language-related challenges at  $p < .001$  (Table 8). This indicates that students with fewer challenges had a larger vocabulary size and higher linguistic proficiency than their counterparts. It is important to clarify that the Likert-scale ranged from 1 (very difficult) to 5 (very easy); lower and higher ratings on the challenges questionnaire indicated a larger and smaller magnitude of challenges, respectively. The results also showed that academic listening only showed a weak to moderate correlation with both receptive and productive vocabulary size ( $r = .494$  and  $r = .490$ , respectively) although all the other academic English skills achieved strong correlations.

**Table 8: Spearman correlations between English proficiency, challenges and vocabulary size**

	Receptive vocabulary size	Productive vocabulary size	English proficiency
<b>Writing skills</b>			
r	.507**	.617**	.517**
Sig. (2-tailed)	.000	.000	.000
<b>Reading skills</b>			
r	.575**	.553**	.596**
Sig. (2-tailed)	.000	.000	.000
<b>Speaking skills</b>			
r	.544**	.513**	.595**
Sig. (2-tailed)	.000	.000	.000
<b>Listening skills</b>			
r	.494**	.490**	.540**
Sig. (2-tailed)	.000	.000	.000
<b>English proficiency</b>			
r	.559**	.622**	-
Sig. (2-tailed)	.000	.000	-

Note: N=103, \*\*,  $P < 0.01$  level (2-tailed),  $r$ =correlation coefficient. The correlation coefficient is a measure of an effect size: ( $r = .1$ ) is small, ( $r = .3$ ) is medium and ( $r = .5$ ) is large effect (Field, 2018).

## 5. Discussion

This study showed that prior exposure to English mediated English language classes at a high school level had a significantly positive impact in terms of adjusting to an EMI university. Graduates of such high schools had fewer problems adjusting to their EMI contexts. This finding, consistent with previous transition studies (Evans & Morrison, 2011; Sultana, 2014), emphasises the importance of prior experience of learning through EMI as the significant constellation of factors influencing adjustment. The interview findings also indicated the benefit of EME education systems in enhancing learner self-efficacy (e.g. willingness to use

English). One possible explanation for this advantage in relation to the government initiatives (e.g. SGH and SSG) is that the EME students had had access to a range of extracurricular school activities requiring the active use of English, such as “overseas field work” (MEXT, 2018). These high school opportunities offered a preparatory style program for provisional students transitioning into English-medium higher education. Similarly, we also found in response to research question two, that the EME students, consistent with Lin and Morrison (2010), obtained a larger receptive and productive academic vocabulary size than their JME counterparts. While reaching the satisfactory level of receptive and productive vocabulary knowledge, the EME student interviewees expressed challenges associated with insufficient vocabulary knowledge. This mirrors Evans’s and Morrison’s (2011) study, which claimed that acquiring technical discipline-specific vocabulary is an academic challenge commonly expressed by students regardless of L2 proficiency. Interestingly, inconsistent with Uchihara and Harada (2019) who found that vocabulary measures were not significantly correlated with academic outcomes, in our study, vocabulary was strongly associated with self-perceived language-related challenges as evident in our findings for research question three. Insufficient vocabulary knowledge was shown through this study to be a problem related to all four aspects of academic English skills, concurring with previous studies (e.g. Koizumi & In’nami, 2013; Harrington & Roche, 2014).

## 6. Limitations and further research

Finally, some limitations of the study and suggestions for future research are discussed. Firstly, the questionnaire using Likert-scales merely produced self-assessed responses. Direct instruments (e.g. content test, exam scores) should instead be used for future research to directly measure students’ performance in EMI as a means to triangulate self-reported data sources. Secondly, while the present study adopted the productive version of the VLT, Webb (2019) and Miralpeix (2019) suggest that this is merely a measure of receptive or “controlled productive vocabulary”, seeing that the first letters of each word are supplied to help learners complete the rest of the words. Accordingly, we suggest that other productive tests (e.g. Lex30 by Fitzpatrick & Meara, 2004) should be used in conjunction with the present test in future research to corroborate the current findings. Additionally, the order of the tests might have affected the vocabulary scores. In the present study, the receptive test was administered first, which might have contributed to a boosted score in the productive test. Finally, an issue of homogeneity of each variable is considered. When examining high school background as an independent variable, other factors (e.g. language learning history, year groups, age and study abroad experience) were not controlled for. Hence, the differences were possibly due to other factors as well, rather than the sole factor of high school background.



## 7. Implications for EAP curriculum planning in EMI programs:

The present study yields various implications while recognising the context-dependent nature of EMI implementation (Author & Other, BBBB), which might limit the generalisability of the current findings. Firstly, given its strong correlation with L2 proficiency, we suggest that EMI lecturers **might wish** to obtain students' high school education information from placement surveys, as one possible indicator of their preparedness for EMI. Our study revealed that challenges expressed by EME high school graduates stemmed from general content-learning issues, whereas their JME counterparts encountered more of language-related issues during the most crucial transition period (i.e. Year 1). Consistent with Macaro's (2018) models of language support in EMI, universities **could** offer different pathways depending on students' high school education system. While our quantitative findings suggested that the students did not achieve productive vocabulary knowledge at a satisfactory level, the qualitative evidence underpins that the lack of both receptive and productive vocabulary knowledge severely impeded their performance in all of the four academic skills. Based on this, EMI preparatory language courses **could** focus on improving students' vocabulary knowledge. Concurring with Webb and Nation (2017), contextualised vocabulary knowledge should be developed that are disciplinary specific by using authentic course textbooks with a glossary of technical terms, rather than direct teaching that covers decontextualised academic vocabulary, given that most words used across different disciplines generally entail different meanings from their general-use meanings. This mirrors recommendations from Galloway and Ruegg (2020) who call for increased collaboration between academic English and content instructors to achieve more specialised preparatory English courses. Finally, although this article has placed an exclusive focus on domestic students as a key stakeholder of EMI provision, an EMI student body, in reality, comprises of a diverse range of student populations with different nationalities, levels of language proficiency, educational backgrounds, and varying proportions of domestic and international students. This article aims to provide implications for EMI universities that are seeking to expand their EMI programmes for domestic students and thus future research is needed to address the specific challenges of international students in EMI, who may come from more diverse high school backgrounds.

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## Appendix 1 – EMI Challenges Scales

### *Academic Writing Skills*

- 1 Planning written assignments
- 2 Expressing ideas in correct English
- 3 Revising written work
- 4 Using appropriate academic style
- 5 Writing a bibliography/ references section
- 6 Proofreading written work
- 7 Referring to sources in written work
- 8 Summarizing/ paraphrasing ideas in sources
- 9 Organizing ideas in coherent paragraphs
- 10 Expressing ideas clearly and logically
- 11 Linking ideas from different sources
- 12 Writing the introduction to an assignment
- 13 Writing the body of an assignment
- 14 Writing the conclusion to an assignment
- 15 Linking sentences smoothly

### *Academic Reading Skills*

- 1 Understanding specific vocabulary
- 2 Working out the meaning of difficult words
- 3 Reading carefully to understand a text
- 4 Reading quickly to find specific information
- 5 Identifying supporting ideas and examples
- 6 Reading quickly to get overall meaning
- 7 Identifying the key ideas of a text
- 8 Taking brief, relevant notes
- 9 Using your own words when taking notes
- 10 Understanding the organization of a text

### *Academic Speaking Skills*

- 1 Speaking accurately (grammar)

- 2 Speaking clearly (pronunciation)
- 3 Presenting information/ ideas
- 4 Participating actively in discussion
- 5 Communicating ideas fluently
- 6 Speaking from notes
- 7 Asking questions
- 8 Answering questions
- 9 Communicating ideas confidently
- 10 Using visual aids (e.g. PowerPoint)

### *Academic Listening Skills*

- 1 Understanding the main ideas of lectures
- 2 Understanding the overall organization of lectures
- 3 Understanding key vocabulary
- 4 Taking brief, clear notes
- 5 Identifying supporting ideas and examples
- 6 Understanding lecturers' accents
- 7 Following a discussion
- 8 Identifying different views and ideas
- 9 Understanding questions
- 10 Understanding classmates' accents

## **Appendix 2 – Semi-structured Interview Guide**

NB. The interview questions are adopted from the interview protocol devised by Evans and Morrison (2011).  
The original interview questions are in Japanese and translated into English as below.

### **Challenges associated with Academic English use in EMI classes**

- How do you enjoy learning content through English? Do you find it easy or difficult?
- Can you share your experience of using English in your EMI courses?
- Do you face any difficulties in using English in your EMI courses in terms of:
  - 1) Reading
  - 2) Speaking
  - 3) Listening
  - 4) Writing
  - 5) Vocabulary
  - 6) Grammar
- What are some of the difficulties in taking university courses in English?  
(Probes - which class, which aspect of academic English)
- What are the main differences between high school and university, in terms of challenges you face when learning content?
- Which aspects of academic English would you like to improve the most? Why?