

Unraveling EMI as a predictor of English proficiency in Vietnamese higher education: Exploring learners' backgrounds as a variable

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Abstract

One key objective of English medium instruction (EMI) programs in non-Anglophone countries is to improve students' English skills in both academic and professional environments. Despite the high cost and the popularity of the program policy, there remains a lack of empirical studies on the link between attending an EMI program and students' English proficiency. This paper employs data from 111 students majoring in international business from a top Vietnamese university to compare English competency, measured by the Duolingo Test, between students enrolled in an EMI program and their counterparts who are taught the same curriculum but in the native language, through Vietnamese medium instruction (VMI). Controlling for different social backgrounds, the study shows that participation in EMI is associated with better English test performance. Analysis using multiple interaction terms shows that male EMI participants, or students coming from lower-income households, having lower English scores in high school, and attending more English private tutoring would benefit more from EMI. The analysis sheds light on potential socioeconomic obstacles to accessing EMI and English skill development. Follow-up interviews similarly show the relevance of demographic backgrounds to the students' perceptions of EMI and their English proficiency. The study provides clear evidence of substantial associations between EMI and English skills. Further studies are needed to establish the causality of the results.

Keywords: EMI policy; English proficiency; social stratification; EMI impact; Duolingo English Test

1. Introduction

English as a medium of instruction (EMI) has emerged as a major asset for internationalizing universities in non-Anglophone countries in recent years (Dearden, 2014; Macaro, 2015). Since most EMI students are L2 English speakers, improving students' English proficiency is one of the program's top priorities (Aizawa & Rose, 2019; Byun et al., 2011; Cho, 2012; Hamid et al., 2013; Hu & Lei, 2014). Debates around the effectiveness of highly expensive programs with English as the medium of instruction in terms of English development and, more generally, academic attainment have been increasingly popular (Aizawa et al., 2020; Curle et al., 2020; Rose, Curle et al., 2020; Xie & Curle, 2020; Yuksel et al., 2023). Yet, the conclusion remains elusive and little has been done when it comes to using data from an emerging context such as Vietnam. This study sets out to fill the gap by exploring the extent to which EMI learning could predict student English proficiency when compared to a non-EMI cohort. Section 2 discusses the current literature on EMI and related EMI studies on language outcomes. Section 3 describes the Vietnamese student data and the survey. Methodological issues are presented in section 4 before discussing the results and policy implications in section 5. Section 6 concludes with potential research avenues.

2. Literature review

2.1. Language proficiency outcomes in EMI

The ability of a language user to effectively apply language knowledge and linguistic competence in both general and specific contexts can be understood as second language (L2) competency (Hulstijn, 2011). The topic of whether EMI can increase student English competence continues to spark a great deal of scholarly interest because language learning remains one of the core goals of EMI. Rogier (2012) conducted one of the first studies in this field at an EMI university in the United Arab Emirates. Overall, the findings demonstrated that there was only a relative minimum increase for such a long period as a four-year program. However, there was no direct non-EMI group during that time to use as a reference point for comparison. The main question of whether EMI students genuinely improved their English abilities more than those without EMI, and if so, by how much, remains unresolved. At most, the data can only give insight into the score discrepancies among students who get the same EMI lessons. Lei and Hu (2014) conducted a comparative study on English proficiency among EMI and Chinese medium instruction (CMI) students in a Chinese higher education context. Regression results showed that prior English competence was the best indicator of future

English exam results, which reiterated the critical need to take into consideration students' educational and linguistic backgrounds when evaluating the results. However, as Lei and Hu (2014) opted for using the national high-stakes English test which was only used in China as a measure of English proficiency, more details about the test validity and reliability should have been included to support the interpretations of the findings. An account from an EMI university in Turkey was presented by Yuksel et al. (2023). This study, which concentrated on the last years of study, can complement Lei and Hu (2014) and other studies that only focus on the initial stages of EMI involvement. At this Turkish university, EMI is taught via a hybrid delivery system, and students are required to take both Turkish medium instruction (TMI) and EMI courses over their four years of study. The results showed a statistically significant improvement in English proficiency, which serves as the best predictor of academic achievements over four years. The analysis would have been more complete if the impacts of TMI had also been taken into consideration in terms of language and academic score alterations, given the multilingual nature of EMI in the context of the study. A mixed-methods study conducted at a Croatian university with EMI and non-EMI students was contributed by Čakarun and Drljača Margić (2021). After two years of study, both groups displayed an equally significant improvement in their Business English. However, there were 264 non-EMI students and only 58 EMI students in the study, underrepresenting EMI students in the participant sample as a whole.

2.2. Growth of EMI in Vietnam

Since the first officially recognized EMI program was started in 1998, there have been more than 300 EMI programs offered in 84 of Vietnam's 237 higher education institutions as of 2017 (VIED, 2017, as cited in Ngo, 2019). The development of EMI in Vietnam continues to be contentious and dynamic (Galloway et al., 2020; Hoang et al., 2018; Tran & Nguyen, 2018). From a policy-making perspective, there has been significant pressure on EMI to improve individual competency and national competitiveness in a globalized context (Nguyen et al., 2017; Noorashid, 2020). As a result, a growing number of higher education institutions in Vietnam are now offering EMI programs to Vietnamese undergraduate students. Parallel to this, the majority of university students in Vietnam enroll in Vietnamese medium instruction (VMI) programs, where all courses are taught in Vietnamese, the only official language, while English or a second foreign language is taught as a course in addition to the students' majors. The tuition charged for English-mediated programs is more than twice as much as that for Vietnamese-mediated programs, which constitutes the primary distinction between EMI and VMI (Nguyen et al., 2017). Because of this, the English-mediated option is primarily available and

affordable for the more affluent groups, raising concerns about a growing social division in Vietnamese higher education (Tri & Moskovsky, 2019). Tri and Moskovsky (2019) observed an upsurge in EMI programs, particularly for business-related subjects because students from the developing middle class found it more affordable than studying abroad. Since EMI programs are offered locally, those students can still receive an education in English without having to pay the exorbitant living expenses associated with studying abroad. One of the fundamental assumptions behind joining EMI in Vietnam is that students' English ability would inevitably increase as a result of extensive exposure to an English-speaking environment (Noorashid, 2020; Pham & Ba-Ngoc, 2020). However, several researchers have cautioned that EMI cannot always ensure language learning gains (Chapple, 2015; Lei & Hu, 2014; Taguchi, 2014; Yang, 2015). Although there has been much research on EMI-driven proficiency around the world, this study is one of the first attempts to take into consideration the confounding factors that contribute to EMI success when compared to an equivalent non-EMI group.¹ As indicated in the literature, it is hypothesized that in Vietnam participating in EMI is positively associated with higher English proficiency. The first research question is as follows:

RQ1: Does English medium instruction predict student English proficiency?

Another understudied area of research concerns the significance of learners' background characteristics in predicting and explaining the effectiveness of EMI (see Macaro, 2018; Macaro et al., 2018). Because of the costly nature of attending an EMI program, questions have been posed to the policymakers on whether and how to bridge the gaps between the English skill improvement for different social groups, classified by the student's household income, gender, pre-university English ability, and on-going private tutoring expenses. These questions are addressed using an interaction variable regression analysis. It is hypothesized that the predictability of EMI with respect to English proficiency is differentially distributed across sub-groups of learners, classified above. The question is of considerable interest to policymakers for their resource allocations in helping different social groups to access and benefit from EMI learning. The second research question is formulated as follows:

RQ2: How does the predictive effect of EMI on English proficiency vary across the socioeconomic backgrounds of the students?

Finally, this study aims to complement the wider literature on promoting a student-centered active learning pedagogy in EMI (Dimova et al., 2015; Dimova & Kling, 2020). In particular, it explores how students perceive themselves and their experiences

¹ Some of the findings reported in this study have been previously presented in Nguyen (2021).

of each respective medium of instruction stream through a qualitative analysis using in-depth interviews with the participants. The third question is as follows:

RQ3: How is the relationship between the medium of instruction and English proficiency perceived by students?

Together with quantitative relating to in the previous questions, qualitative analysis would shed light on the effectiveness of the EMI policy and on how students from different backgrounds would benefit from access to EMI. Without claiming to establish causality in the results, the study shows that in the sample selected for the analysis, EMI students have on average higher English proficiency, measured by the Duolingo test. Using regression analysis with different interaction terms, there is evidence that EMI students from disadvantaged backgrounds, such as those having fewer English private tutoring hours or lower English pre-university grades, on average have lower English proficiency scores than their counterparts. Male EMI students on average perform better than female EMI students in the Duolingo test, while there is no statistical difference in English proficiency between students from higher-income households and those from lower-income households. The thematic content analysis further supports the quantitative results.

3. Method

3.1. Setting

In the Vietnamese public school system, Grade 12 students are required to sit the National High School Graduation Examination. English, mathematics, and Vietnamese literature are the three mandatory exam papers in this national assessment. Test-takers will then use the results to apply for admission to Vietnamese public universities and colleges (Duong, 2019). This study was conducted at a public university in Hochiminh City, Vietnam. Prospective students must meet the same threshold requirement for the aggregate score of the three test papers to be admitted to the International Business program. Around 450 students are enrolled in the international business (IB) program across every academic year, while there are 160 students for the EMI route and 290 for the VMI route. It is important to note that students are self-selected into the EMI and the VMI route for the same degree program. Because admission to the program is based on the aggregate test score and admission to each instructional route is through self-selection, there is no guarantee that EMI and VMI students are homogenous in relation to their pre-course English background. On this premise, this study seeks to examine the English proficiency outcomes of students from both academic streams.

3.2. Participants

Data for this study were gathered in May 2021 from 111 third-year students (50 EMI and 61 VMI) who had all been immersed in their respective instructional studies for at least three years. In terms of gender composition, there were 45 male and 66 female students. All participants were Vietnamese, therefore the first language noise issue can be removed. Furthermore, none of them were exposed to any previous formal EMI learning as they were all enrolled in Vietnamese medium high schools across Vietnam. In principle, the EMI IB students take all the chosen subjects in English and the VMI IB students are taught academic content in Vietnamese. At university, students complete exams in the same language as their respective instructional medium. One exception is that both VMI and EMI students must complete the Marxist-Leninist philosophy and national security courses in Vietnamese during the first term of their studies.

3.3. Data collection

First, students filled out a questionnaire requesting demographic data such as age, gender, household income, number of hours per week spent receiving private English instruction, and entry English test scores. An open-ended question at the end of the survey allowed students to elaborate anonymously on how they perceived their choice of educational medium and progress in their English ability related. The second task required participants to complete the online Duolingo English test. The test contains both discrete-point tasks which assess language components such as vocabulary items, grammar points, and sentence structures, and integrative tasks which measure the incorporation of multiple skills such as dictation, an oral interview, and essay writing (Bézy & Settles, 2015; Isbell & Kremmel, 2020; Wagner, 2020; Ye, 2014). In terms of the test structure, Duolingo comprises two parts, namely, the computer-adaptive part for short-response items and the examinee's extended speaking and writing performances for stakeholders' in-depth review (Isbell & Kremmel, 2020). The overall scores are presented on a 10-160 scale with a sub-scale for literacy, conversation, comprehension, and production that tap into users' general English proficiency (Isbell & Kremmel, 2020). Duolingo is one of the most popular English learning platforms and it offers a free version of the English proficiency test. The paid version of the test, which consists of a series of questions to evaluate English skills in 45 minutes, is widely accepted by thousands of universities.² The free test version provides a shorter list of questions and should be taken within 15

² <https://englishtest.duolingo.com/institutions>

minutes. Because of the cost and time effectiveness, this study adopted the free version for flexibility and higher probability of retaining interviewee participation. The participants then reported their Duolingo results, together with a screenshot of their confirmation page for verification purposes.

3.4. Data operationalization

Armed with the individual surveys, the present author collated the information and constructed the following list of variables.

Outcome variable: The individual Duolingo test result for each participant is used as a proxy measure of English proficiency, coded as $DuoLingo_i$.

Main explanatory variable: The key variable of interest is the medium of instruction (MOI_i) which was coded as 1 if the participant enrolled in the EMI route, and as 0 for VMI students. Amongst 111 participants, 61 enrolled in VMI and 50 enrolled in EMI. In the regression analysis, the estimates associated with this variable are of our interest. Because the admission decision to the EMI/VMI route relies entirely on the self-selection of the applicant, a rudimentary comparison of the outcome variable between EMI and VMI students would be subject to selection bias: there are fundamental differences between VMI and EMI students, and EMI students elected themselves to take the EMI route as they were already more capable in English. To address this concern, information on an array of variables was collected to capture the potential socioeconomic differences between the students that may explain the self-selection into the EMI stream. Admittedly, the control variables only provide a setting in which the outcomes of the VMI and EMI participants are compared while only a few socioeconomic background factors are taken into account.

Control variables: First, the author collected the entry English grade ($EntryEnglish_i$) for each student, which included the test scores from the National High School Graduation Examination on a 1-10 scale as a measure of prior English background. Following the official classification of the Ministry of Education, EEQ was coded as 0 if the grade was lower than 8.0 (less than good), and as 1 if the grade was at least 8.0 (good and excellent). Students in the sample scored from 5.0 to 9.8 and were classified into two levels with the 8.0 cut-off point, as usually used in the official classification. Second, the socio-economic background was captured by using a self-reported household income ($HIncome_i$) variable, which recorded the monthly household income of the participants. The Statista country report on the categorization of the average monthly income in Vietnam in 2021 (Nguyen, 2022) was followed to code the variable as an ordinal variable, in which level 1 (low) is assigned to families earning less than (equivalently) £313 per month,

and level 2 (high) to those earning more than £313 a month. Third, information on gender ($Gender_i$) was collected, a binary variable for the student gender, equal to 1 if female, and 0 if male. Finally, private English tuition ($EngTuition_i$) was used, which indicated the weekly hours of attending after-class English lessons as a proxy measure of supplementary language support and students' effort to learn English. The variable was coded on a binary scale, with level 1 (low) to indicate fewer than three hours of private tuition per week, and level 2 (high) for more than three hours per week. The binary structure of the control variables was used to preserve the classification of the pre-test performance of the participants and to avoid any subjective bias in a more granular classification. Having binary measures also offers simplicity for differential effect analysis in section 5.2, and consistency when discussing and comparing the results with other studies. The author will further discuss how the control variables can help address the selection bias concern in section 5.1.

Table 1 presents the summary statistics for the study participants. According to the descriptive statistics, the highest Duolingo score was 145, which is equivalent to an 8.5 score in the IELTS, and the lowest was 45, which is equivalent to a 3.5 IELTS. Given that all participants had to meet the same grade requirements to be admitted to both instructional programs at the beginning of their course, the disparity in Duolingo scores is striking. This gap in Duolingo scores among participants after three years of exposure to the respective instructional program reinforces the study's goal of determining the predictive role of EMI with regard to student English proficiency. The skewness was -0.223, which was within the acceptable range of -1 to +1.

Table 1 Descriptive statistics of variables in this study

Variable	Min	Max	M	SD	Skewness
MOI_i	0	1	.45	.49	.19
$Gender_i$	0	1	.59	.49	-.39
$EntryEnglish_i$	0	1	.61	.49	.67
$HIncome_i$	0	1	.34	.48	-.47
$EngTuition_i$	0	1	.38	.49	.51
DuoLingo _i	45.0	145.0	104.36	23.42	-.22

4. Data analysis

RQ1: Does English medium instruction predict student English proficiency?

To explore the extent to which the medium of instruction (MOI) could predict English proficiency (RQ1), a multivariate regression analysis was employed, using control variables to account for potential self-selection into EMI. Statistical analysis of the estimates, together with hypothesis testing, shed light on the statistical

significance of the association. Due to the data limitation and the non-randomization of the MOI selection, even with the inclusion of the control variables, the results should be viewed as an exploratory analysis of the relationship between the medium of instruction and English outcome, holding several important socioeconomic characteristics constant. Instead of claiming to show a causal effect of MOI, the analysis was more modest and focused on the different factors that could predict English proficiency in one of the top Vietnamese universities.

To evaluate how well the medium of instruction, MOI_i , can explain or predict the differences in the student English proficiency, measured by the Duolingo test (DuoLingo), two regression models were employed. First, a simple univariate regression between the two variables was used to directly compare the English proficiency between VMI and EMI students, regardless of their socioeconomic background. The estimated coefficient, β_1 , in Equation (1), was of interest, showing the strength of the association between MOI and English proficiency.

$$\text{DuoLingo}_i = \alpha + \beta_1 \text{MOI}_i + e_{1i} \quad (1)$$

where e_{1i} is the error term, that captures unobserved factors that can affect the performance in the Duolingo test.

A pertinent concern is the self-selection into EMI by the students: students with already better English preparation would likely self-select themselves to choose English as their main language of learning. The direct comparison in (1) is then likely to be biased and entirely reflect the pre-test differences in the students' English ability. Because it is not possible to observe the true English ability of the students before taking the university course, four variables were used to capture the pre-test factors: the English entry grade before university, the household income, gender, and private tuition hours. Even though these variables will not fully capture all unobserved factors that influence self-selection, they do give us a fairer and more nuanced comparison. The regression equation is described in Equation (2), with e_{2i} being the error term, and β_1 remains our estimate of interest.

$$\text{DuoLingo}_i = \alpha + \beta_1 \text{MOI}_i + \beta_2 \text{Gender}_i + \beta_3 \text{HIncome}_i + \beta_4 \text{EngTuition}_i + \beta_5 \text{EntryEnglish}_i + e_{2i} \quad (2)$$

Besides the concern of self-selection bias, other linear regression model assumptions are worth discussing. First, it is posited that the control variables are not highly correlated with the main variable of interest MOI. When checking for multicollinearity, the VIF coefficients for all predictors are all less than 3, indicating that there is no violation of multicollinearity. Heteroskedasticity is also not present in the analysis, and robust standard errors were checked for any concern

of its violation. The residuals reasonably resembled a normal distribution with a sample size of 111 (following Tabachnick & Fidell, 2013, the formula of $N > 50 + 8m$ where m = number of exploratory variables).

RQ2: Are there any differential effects of EMI between different social groups?

Within the wider methodological literature of social sciences, the use of multiplicative interaction terms in multiple regression analysis, also known as interaction term analysis, is a well-validated technique to assess differential effects of predictors on outcomes (Bauer, 2011; Cohen et al., 1983; Jaccard et al., 1990, 2003). The rationale for this analysis is clear. It was expected that students from a more favorable social background would be able to benefit from having English as the main medium of instruction *differently* from students coming from less privileged backgrounds. Such heterogeneity across the sub-groups will be the focus of this section. Without overclaiming obtained results as representing the differential causal effect of MOI, they should be viewed as shedding light on the heterogeneity of the relationship between MOI and English proficiency in terms of four social factors: household income, gender, pre-university English ability, and extra-curricular English learning in the form of private tuition.

There are several potential socio-economic factors of interest. First, it was hypothesized that students from high-income families attending EMI would perform differently compared to their low-income counterparts. To do so, the present author used the household income (HI) variable, coded already as a binary variable, and added its interaction with MOI. Second, the MOI and English proficiency relationship was explored in terms of gender, hypothesizing that male students attending EMI would perform on the test differently from their female counterparts. Following the same logic, in alternating order, the author included in the regression equation (2) interactions between MOI with gender, with EngTuition, and finally with *EntryEnglish_i*. The EngTuition and EntryEnglish variables were already coded as binary variables, with 0 representing less favorable social backgrounds (lower English entry grade or less private tuition), and 1 the other way around. Equation (3) describes these regressions with interaction terms in a more general form:

$$\text{DuoLingo}_i = \alpha + \beta_1 \text{MOI}_i + \beta_2 \text{Gender}_i + \beta_3 \text{HIncome}_i + \beta_4 \text{EngTuition}_i + \beta_5 \text{EntryEnglish}_i + \gamma \text{interaction}_i + e_{3i} \quad (3)$$

where interaction_i denotes the interaction term between MOI_i and one of the following: (i) Gender_i , (ii) HIncome_i , (iii) EngTuition_i , (iv) EntryEnglish_i . γ now captures the differences in the relationship between the medium of instruction MOI and English proficiency within the social groups defined by the binary

variable used in the interaction term analysis. The next section discusses the results of these regressions.

RQ3: How do students perceive the relationship between the medium of instruction and English proficiency?

To further understand the experience of different MOI at the individual level, in particular, students' self-perception of their proficiency (RQ 3), the regression analysis was complemented with in-depth interviews. Fifteen participants, six from the EMI strand and nine from the VMI course, were randomly selected and agreed to take part in a 45-minute interview. The interviewees were asked to share their perceived impact of the language of instruction on their English learning and proficiency development, in response to open-ended and follow-up questions. The interview scripts were transcribed and translated, and a thematic content analysis (using NVivo 12) was performed. Table 2 describes the backgrounds of the interview participants.

Table 2 Interview participants (cf. Nguyen, 2021)

ID	MOI	Gender	Income	Entry English	English Tuition	Duolingo
Student 1	VMI	Female	< £313	> 8.0	> 3 hours	102
Student 2	VMI	Female	< £313	< 8.0	<3 hours	100
Student 3	EMI	Female	> £313	> 8.0	<3 hours	140
Student 4	EMI	Female	< £313	> 8.0	<3 hours	145
Student 5	EMI	Male	> £313	> 8.0	<3 hours	137
Student 6	VMI	Male	< £313	> 8.0	<3 hours	100
Student 7	VMI	Male	< £313	> 8.0	<3 hours	95
Student 8	VMI	Female	< £313	> 8.0	<3 hours	95
Student 9	EMI	Male	> £313	> 8.0	<3 hours	120
Student 10	VMI	Male	> £313	< 8.0	> 3 hours	92
Student 11	VMI	Female	> £313	< 8.0	<3 hours	90
Student 12	VMI	Female	< £313	> 8.0	<3 hours	86
Student 13	EMI	Female	> £313	> 8.0	<3 hours	125
Student 14	EMI	Female	> £313	> 8.0	<3 hours	122
Student 15	VMI	Male	< £313	< 8.0	> 3 hours	85

5. Findings

5.1. English medium instruction as a predictor of student English proficiency

Table 3 presents obtained results from both models. Column (1) shows the direct comparison of VMI and EMI students, without any control variables. Having English as the MOI at university was on average associated with nearly 17 points higher in the Duolingo test for the participants. Given the standard deviation of the Duolingo variable is 23.42, the difference of 17 points is qualitatively large

and statistically significant ($p = .002$). The predictability of Model 1 is relatively high with an R^2 of .131, suggesting that 13.1 % of the variance in the student English proficiency scores can be explained by a model containing only the medium of instruction as the dependent variable.

When the control variables for socioeconomic backgrounds were included in Model 2, its predictability increased substantially ($R^2 = 22.8\%$). The MOI remains a statistically significant predictor – EMI students on average got nearly 14 points higher in the Duolingo test, nearly half of the standard deviation of the Duolingo variable. Consistently with our expectation, students with a higher English entry grade also did statistically better in the Duolingo test, with a difference of 6 points. Male students seemed to perform worse on the test, even though the estimate (-4.62) was not statistically significant. Coming from a richer household or having more intensive private tutoring were also positively correlated with a higher Duolingo test score, even though the difference was small (around 1 point) and statistically insignificant. The F -statistics in both models were high, indicating that all the variables included were jointly significant in predicting and explaining the Duolingo test performance.

Table 3 Regression results of EMI effects on English proficiency scores

	Dependent variable: Duolingo	
	Model 1	Model 2
Medium of instruction	16.930*** ($p = .0001$)	13.791*** ($p = .002$)
Course entry English grades		6.012*** ($p = .002$)
Gender		-4.621 ($p = .265$)
Household income		1.338 ($p = .431$)
Private English tuition		1.016 ($p = .685$)
Constant	96.730*** ($p = .000$)	46.791** ($p = .011$)
Observations	111	111
R^2	0.131	0.228
Adjusted R^2	0.123	0.191
Residual Std. Error	21.932 ($df = 109$)	21.061 ($df = 105$)
F Statistic	16.374*** ($df = 1; 109$)	6.193*** ($df = 5; 105$)

Note. * p ** p *** $p < .01$

5.2. Predictive effects of EMI across students' backgrounds

Having shown that MOI is a statistically significant predictor of students' English proficiency, as measured by the Duolingo test performance, the paper now turns to explore how different social backgrounds are related to the predictability of MOI (RQ 2).

5.2.1. The differential effect of medium of instruction by gender

Table 4 presents the results from the interaction terms analysis. Column (i) shows a statistically significant difference in how male and female students in the EMI and VMI programs performed in the Duolingo test. As Table 4 suggests, male students in general performed better in the Duolingo test. Yet, per Column (i), a female students attending the EMI program had a higher Duolingo test score than their male counterparts. Without any claims for of causal effects, this result suggests that without considering the MOI, females tended to do worse in the English test, but once we consider the medium of instruction, female students seemed to benefit more from EMI than their male counterparts. The differential effect, the γ estimate, was large (20 points, nearly equal to the standard deviation), and statistically significant at the 5% significance level ($p = .022$). Female students seem to be facing certain barriers to accessing EMI and thus, improving their English proficiency. However, having gained access to an EMI program, the female students would tend to significantly benefit more from the EMI than their male counterparts.

Table 4 Interaction term analysis between medium of instruction and other predictors (Nguyen, 2021)

	Dependent variable: Duolingo			
	(i)	(ii)	(iii)	(iv)
Medium of instruction (MOI) (VMI = 0, EMI = 1)	4.726 ($p = .462$)	18.733*** ($p = .0003$)	-0.067 ($p = .993$)	59.529* ($p = .055$)
Gender (G) (M = 0, F=1)	14.936** ($p = .012$)			
Interaction of MOI and G	19.571** ($p = .022$)			
Household income (HI) ($<£313 = 0, >£313 = 1$)		7.678 ($p = .109$)		
Interaction of MOI and HI		-5.356 ($p = .429$)		
Private English hours (PEH) ($<3 \text{ hours} = 0, >3 \text{ hours} = 1$)			-17.289*** ($p = .005$)	
Interaction of MOI and PEH			25.305*** ($p = .004$)	
Entry English grades (EEG) ($<8 = 0, >8 = 1$)				8.270*** ($p = .001$)
Interaction of MOI and EEG				-5.500 ($p = .141$)
Constant	106.524*** ($p = .000$)	91.695*** ($p = .000$)	108.917*** ($p = .000$)	30.951 ($p = .101$)

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

5.2.2. The differential effect of medium of instruction by household income

Column (ii) in Table 4 indicates that students from higher-income households benefited less from attending EMI than students from lower-income households. The difference was, however, small and amounted to only 5 points on the Duolingo score. The differential effect was also not statistically significant ($p = .429$), perhaps due to the small sample size. Regardless of the insignificance, the score

difference should be of interest to policymakers. One plausible explanation for this finding is that the high-income students could have started with higher English proficiency so English medium teaching would not result in significant improvement without any causal implication, as compared to what EMI would bring for students from low-income households. This result suggests clear opportunities for policymakers to bridge the English skills gap between less advantaged students and their more affluent counterparts.

5.2.3. The differential effect of medium of instruction by English private tuition

Column (iii) in Table 4 shows that conditional on attending EMI, students with more private English tuition performed better than students with less private English tuition. This differential effect was considerable (nearly 25 points, higher than the differential effect by gender) and statistically significant ($p = .004$). Since private English tuition is seen as a common practice for university students in Vietnam, the substantial differential effect of having more than three hours of private tutoring is practically meaningful and important to address. One implication is that formal English teaching in university courses alone seemingly is not sufficient for EMI students to improve their English skills. Private tutoring is an effective alternative to their English training progress. As it is expensive to have private tutoring, this result further accentuates the differential impact of economic background on student English performance. Whilst EMI students are on average more proficient in English than their VMI peers, this gap is attributed to the fact that EMI students also attend extra English tutorials for more than three hours a week. The detected interaction effect between EMI and private English tuition implies that the positive effect of English proficiency might have not come entirely from being enrolled in the EMI program.

5.2.4. The differential effect of medium of instruction by entry English grades

Column (iv) in Table 4 shows that students who previously performed better in English at the National Entrance Examination seemed to benefit less from EMI than lower achievers. Whilst students with higher pre-university English test scores are significantly more likely to have higher proficiency scores, as shown in regression results in Table 3, the negative interaction term effect indicates that once entering university, EMI students improve their English proficiency less than their lower achieving counterparts. The effect of EMI on high school achievers was lower than that on students with lower-entry English results. For low-achievers, attending an EMI course was associated with a 59 points higher score ($p = .06$) in the Duolingo test on average. For high-achievers, the difference was small (5.5 points) and statistically insignificant. The

results support the importance of having English as the MOI at university for students who do not do well in National Entrance Examinations.

5.3. Students' perceptions of the relationship between medium of instruction and language learning

The third research question pertained to how students perceive the connection between the medium of instruction and language learning. To investigate this issue, information from interviews and open-ended questionnaire responses was utilized. Through thorough thematic analysis, two prominent themes were identified: initial expectations before the course and the actual learning experience during the course. The subsequent analysis is structured around these two themes.

5.3.1. Pre-course expectations and motivations

Students provided diverse explanations for their selection of a particular instructional medium. Among those in the EMI group, the primary motive for investing additional resources in English-based instruction was the desire to enhance their English skills, both in general and in an academic context. As explained by Student 3:

I chose to study EMI program because I hope it will equip me with a good foundation in Business English and General English, which will enable me to communicate better and understand materials in English for my jobs in the future.

Student 5 also concurred with this view by saying:

I chose EMI because I realize the growing importance of having good English skills for my future job prospects. I believe that by learning through English medium of instruction I will have more opportunities to improve my English skills.

It is observed that EMI students emphasized their shared expectations to develop English proficiency within the span of the EMI program. Furthermore, it seems that the students were also aware of the instrumental role of having good command of English for future job opportunities. This reflects the students' awareness of the high demand for proficient English skills in the current job market.

Unsurprisingly, we found that the high cost of the EMI program remains the main differentiator between high-income and low-income students. VMI Student 12 (household income level 1 < £156/month) reported:

I chose the VMI program because its flexible structure can allow me to take classes in the afternoon and evenings so that I can take up part-time work in the daytime to

cover my living expenses. The fee for the VMI program is much lower than the EMI so it is more affordable for me and my family.

Besides the key linguistic and economic reasons, students sporadically cited peer pressure, parental guidance, personal academic interest, and prestige as factors that made them decide to opt for their chosen instructional medium program.

5.3.2. Language learning experience within each medium program

All six interviewed EMI students expressed a positive language learning experience with EMI thus far. This finding confirms the detected significant effect of EMI on Duolingo scores in our previous analysis. The one common aspect that was mentioned by all six students was that since they had exposure to the English language in both general and academic contexts, they experienced less anxiety and gradually grew confident in using the language for different purposes. To summarize the experience within the EMI context, Student 5 (Duolingo score = 137/IELTS 8.0) confided:

I have grown to learn more vocabulary especially related to International Business. Using English for class discussions, homework assignments, and even for exams has trained me in the ability to think and work in English as my second language. My general English has also improved through my frequent contact with classmates and lecturers during group work and lectures. I also had a lot of chances to improve my academic English through written assignments and end-of-term exams.

In contrast, VMI students revealed mixed views about their English language learning during their courses. It was found that the majority of VMI students reported mixed experiences with English learning within their program, which is also complementary to the knowledge thus far. VMI Student 12 (Duolingo score = 86/IELTS 5.5) mentioned:

I had very limited exposure to English as there was only one English as foreign language (EFL) subject to take every term. Even so, this module is mostly taught in a grammar-translation approach and there were not many opportunities for me to practice English within my classroom context. I noticed there was a decline in my English test scores after two terms in VMI programs. I also got nervous when speaking English and I usually could not articulate well because I forgot the words that I did not use frequently.

There remained a few exceptional cases where VMI students perceived a trade-off between content learning and language learning across two instructional programs. VMI Student 15 (Duolingo score = 85/IELTS 5.5) commented:

I believe I could have had more chance to improve my English if I went with the EMI option but at the same time, I do not want to trade off my understanding of my major in International Business as I think it would be easier for me to study content in my mother tongue.

This finding points to another important yet often overlooked problem in the EMI program, which is comprehension of disciplinary knowledge. It seems that delivering content knowledge in learners' second language given their limited proficiency, may potentially hamper their academic understanding of the subject. This realization has led VMI student 15 to decide not to take the risk and keep studying in their preferred mode of delivery, that is, Vietnamese.

6. Discussion

6.1. The relationship between attending EMI and student English proficiency

The regression analysis shows that attending the EMI program is a significant positive predictor of English proficiency in the Vietnamese higher education context. Participation in EMI, along with entry English grades, was found to account for 13% of the variance in English proficiency as measured by the Duolingo score. When combined, these factors can explain up to 22% of the variance in English proficiency. The positive association between EMI and English proficiency detected in this study is in line with existing studies in other emerging countries (Hu, 2008; Hu & Lei, 2014). Altogether, evidence to date seems to confirm the time-on-task theory in L2 learning: intensive exposure to the L2 target language is a key determinant of language proficiency among L2 learners (Rossell & Baker, 1996). It is worth noting, however, that the term "proficiency" in this study refers to general English, which was measured by the Duolingo test, rather than academic English especially required for the major of the participants (international business). In other words, the evidence from this study can only confirm the outcomes related to the learners' ability to use four domains of English skills in a common communicative situation, which may or may not apply to more formal, targeted learning contexts. Furthermore, the use of the Duolingo English test also extends the existing collection of testing instruments in which only the IELTS, TOEIC, and OTP tests have been used by current studies to obtain proficiency data (Aizawa et al., 2020; Čakarun & Drljača Margić, 2021; Curle et al., 2020; Rogier, 2012; Yuksel et al., 2023). Similar to previous research findings, this study does not claim to establish causality but, rather, provide a regression analysis with a set of control variables that are relevant to the pre-university (and pre-test) characteristics of the participants. There are potentially unobserved characteristics, such as motivation and intrinsic ability, that remain unaccounted for in the analysis.

6.2. Interaction effect of EMI across sub-groups of learners

Besides the main predictive effect of EMI learning, this study also recognized the complexity underlying the relationship between instructional medium and students' individual and social variations. As a result, the study hypothesized that the detected positive relationship between EMI and student English proficiency is not equally distributed across sub-groups of its learners. Within the wider social science field, the interaction term analysis has been widely employed to identify the heterogeneous effect of outcomes across respondents (Allison, 1977; Jaccard et al., 1990, 2003). Methodologically, this study extended the use of this well-validated statistical approach to explore which groups benefitted the most and the least from EMI participation. It was found that male EMI students did have a higher average Duolingo score than females under the same EMI program, pointing to great potential gains for female learners if they were granted access to EMI. The result adds to the literature on gender-related effects in EMI participation and attainment evidenced in Macaro and Akincioglu (2018) and Sahan et al. (2021) where females were found to be more motivated yet under-represented in EMI. Inequalities are perceived to exist in the current sociological perspectives of EMI learners because relative English proficiency can be used to advance EMI learners ahead of non-EMI learners (Lueg & Lueg, 2015). Notwithstanding, this study found that if lower-income individuals were given access to EMI, they could potentially improve their academic record and English proficiency more than their affluent peers. As tuition for EMI remains prohibitively expensive for most students, more scholarships and financial aid could be channeled to bridge the education gap between the two groups. This is in line with current studies on the sociology and social justice of EMI education in Asian contexts (Hoang et al., 2018; Nghia et al., 2019; Nguyen & Tran, 2018; Sah, 2022; Tran & Nguyen, 2018). At the same time, there is evidence that the current language teaching quality within the EMI program is insufficient, leading students to seek private English tutoring to supplement their L2 learning. As a policy recommendation, university administrators should urgently consider implementing an English preparation program or providing institutional assistance for teacher training. This is in line with the wider research on language support and training for both EMI students and teachers (Aizawa et al., 2020; Aizawa & Rose, 2019; Dearden & Macaro, 2016; Kamaşak et al., 2021; Sert, 2008; Tamtam et al., 2012).

6.3. Perceptions of learners on language learning in EMI

The qualitative findings of this study support the view that language proficiency gains remain the primary goal of the EMI program (Dewi, 2017; Kim et al., 2017; Macaro &

Akincioglu, 2018; Rose, McKinley et al., 2020). EMI students, however, shared the belief that having a high English proficiency would help them secure better job opportunities and enhance their employability, rather than simply seeing language development as the ultimate goal of EMI. This is linked with the emerging research body on graduate employment and EMI (Ekoç, 2020; Huang & Curle, 2021; Seitzhanova et al., 2015; Selvaratnam, 2019; Shmidt, 2018; Tran & Nguyen, 2018; Villares, 2021). Finally, while content learning was not the original focus of this study, there was evidence to suggest that there is an interaction effect between content learning and language development in EMI. This result is related to ongoing debates about the nature of EMI as a language development or content delivery program (Macaro, 2018). More research is required to investigate the interactive effect of EMI on both language proficiency and subject understanding.

7. Conclusion

In this study, EMI was found to be a strong positive explanatory factor in student English proficiency at a Vietnamese university. However, the interaction of EMI and English proficiency scores was disproportionately distributed across sub-groups of its learners with females and participants with lower income benefitting more from EMI than the rest. We acknowledge several limitations of this research. First, the sample size could have been expanded for more statistical power. Second, the sampling was based on students' willingness to participate; therefore, selection bias is unavoidable. Third, whilst an attempt was made to account for control variables, this study does not provide evidence for a true causal relationship between EMI and English proficiency. As regards future research directions, studies that include longitudinal data collection to track changes in proficiency scores, and consider the inter-relationship between language proficiency and content knowledge are recommended.

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