University of Reading

The interplay of motivated behaviour, self-concept, self-efficacy, and language use on ease of academic study in English medium education

Article

Published Version

Creative Commons: Attribution 4.0 (CC-BY)

Open Access

Sahan, K. ORCID: https://orcid.org/0000-0003-4423-3108, Kamaşak, R. and Rose, H. (2023) The interplay of motivated behaviour, self-concept, self-efficacy, and language use on ease of academic study in English medium education. System, 114. 103016. ISSN 0346-251X doi: 10.1016/j.system.2023.103016 Available at https://centaur.reading.ac.uk/111086/

It is advisable to refer to the publisher's version if you intend to cite from the work. See Guidance on citing.

To link to this article DOI: http://dx.doi.org/10.1016/j.system.2023.103016

Publisher: Elsevier

All outputs in CentAUR are protected by Intellectual Property Rights law, including copyright law. Copyright and IPR is retained by the creators or other copyright holders. Terms and conditions for use of this material are defined in the End User Agreement.

University of Reading

www.reading.ac.uk/centaur

CentAUR

Central Archive at the University of Reading

Reading's research outputs online

System 114 (2023) 103016

Contents lists available at ScienceDirect

System

journal homepage: www.elsevier.com/locate/system

The interplay of motivated behaviour, self-concept, self-efficacy, and language use on ease of academic study in English medium education

Kari Sahan [a,*], Rifat Kamaşak [b], Heath Rose [c]

[a] Institute of Education, University of Reading, Reading, United Kingdom
[b] Department of Business Administration, Yeditepe University, Turkey
[c] Department of Education, University of Oxford, Oxford, United Kingdom

ARTICLE INFO

Keywords:
English medium instruction (EMI)
Motivation
Self-concept
Self-efficacy
Language use

ABSTRACT

This paper reports on a mixed-methods study investigating the factors that predict the severity of language challenges in EMI contexts. Data were collected through questionnaires, interviews, and focus groups at a private university in Istanbul. Questionnaire data were collected from EMI students (n = 544) across a variety of disciplines, and interviews (n = 11) and focus groups (n = 6) were conducted with teachers with students, respectively, from a social sciences faculty of the university. Quantitative data were analyzed using multiple regression analysis, and a significant relationship was found between students' motivation, perceived competence, self-efficacy, the amount of L2 used in the classroom and students' challenges. Among these four factors, self-efficacy and motivation had the greatest predictive power in determining students' challenges in EMI courses. The analysis of qualitative data revealed complexities related to students' language learning and academic self-efficacy, as well as their motivation on EMI courses, and the findings highlight the importance of building students' self-beliefs in EMI. Implications are discussed with respect to EMI pedagogy, language support, and future directions for research.

1. Introduction

Due to trends towards the internationalization of higher education, the use of English medium instruction (EMI) has grown at universities around the world. In this paper, EMI refers to the teaching of academic subjects through the English language in predominantly non-Anglophone countries or jurisdictions (Macaro, 2018, p. 18). In Turkey, where the current study is set, the growth of EMI as well as debates surrounding its use have been well documented in the research literature (see, for example, Kamasak & Ozbilgin, 2021; Selvi, 2014).

The switch to EMI is not without its challenges. Drawing on EAP scholarship in Hong Kong, a number of studies have focused on identifying the types of language-related challenges that students experience on EMI courses (e.g. Kamasak et al., 2021a). Research has sought to identify the challenges that students encounter in their EMI content classes and has established that students continue to experience language-related difficulties even after meeting the proficiency requirements for their EMI courses (Aizawa, Rose, Thompson, & Curle, 2020). However, what remains unknown is the extent to which individual and group differences mitigate the

* Corresponding author.
E-mail addresses: k.e.sahan@reading.ac.uk (K. Sahan), rifat.kamasak@yeditepe.edu.tr (R. Kamaşak), heath.rose@education.ox.ac.uk (H. Rose).

https://doi.org/10.1016/j.system.2023.103016
Received 24 June 2022; Received in revised form 17 February 2023; Accepted 21 February 2023
Available online 27 February 2023
0346-251X/© 2023 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

severity with which students experience language-related challenges in EMI courses. Moreover, the concepts of motivated behaviour, self-concept, and self-efficacy remain under researched in EMI contexts, particularly in relation to the challenges that may arise from using L2 English for teaching and learning.

This study takes a novel approach to investigating language challenges in EMI programs by considering challenges as the outcome variable of interest. In doing so, it seeks to understand the extent to which different factors predict the severity of language-related challenges in EMI courses. By identifying factors which may exaggerate or mitigate language-related challenges, this study aims to understand better which students are likely to struggle the most in their EMI classes, thereby allowing teachers and program directors to provide targeted support for these students to improve the quality of learning and academic outcomes.

2. Background to the study

2.1. Students' language challenges and English abilities

Across global contexts, previous studies have found that students experience academic language challenges in a number of areas, including listening comprehension (Hellekjær, 2010), content comprehension (Dafouz, Camacho, & Urquia, 2014), and understanding vocabulary (Chang, 2010; Evans & Green, 2007). Specifically in the context of Turkey, studies have found that students reported language-related challenges even after completing the English preparatory program (Yildiz, Soruç, & Griffiths, 2017; Soruç & Griffiths, 2018), a prerequisite for EMI programs (see Macaro, 2018, for models of language support). A systematic review of EMI research concluded that the situation regarding students' language proficiency in Turkey is one of "deep concern in terms of level of English in general and vocabulary knowledge in particular" (Macaro, Curle, Pun, An, & Dearden, 2018, p. 52). The results of a recent Turkish study, which utilized a validated questionnaire to investigate undergraduate students' (N = 498) language challenge, revealed that EMI students at a university in Istanbul found the productive skills of writing and speaking to be the most challenging aspects of their content classes (Kamasak et al., 2021a).

Given the preponderance of language-related challenges reported in the literature, several studies have sought to confirm the relationship between students' English proficiency and their academic success in EMI programs (see, for example, Curle, Yuksel, Soruç, & Altay, 2020; Rose, Curle, Aizawa, & Thompson, 2019; Xie & Curle, 2022). These studies have highlighted English proficiency as an important–but not sufficient–condition for success in EMI programs, and they add to the body of literature detailing the types of challenges students face. The current study contributes to the understanding of language challenges and the importance of English proficiency in EMI contexts by examining the factors that predict the severity of language challenges in EMI contexts. Specifically, the study aims to investigate the extent to which dimensions of motivation, self-efficacy, and the amount of L2 used in EMI classes predict the severity of language-related challenges in EMI programs, while also qualitatively exploring students' and teachers' perceptions of these relationships. The following sections examine the role of motivation, self-efficacy, and language use in EMI.

2.2. Students' motivation in EMI

Although motivation has consistently been found to be an influential factor in L2 language learning, it can be a difficult concept to measure in L2 medium of instruction contexts due a self-selecting bias: students who are more motivated to learn L2 English might choose to study in EMI programs (Doiz, Lasagabaster, & Sierra, 2014). Indeed, studies in the Turkish context have found that EMI students are primarily motivated by a desire to enhance their career prospects and improve their English language skills (Sahan & Şahan, 2021; Kirkgöz, 2005). As such, research investigating motivation in EMI has to untangle different aspects of learner motivation to learn English and/or to learn through English, which requires careful consideration of motivational constructs.

Motivation in Rose et al.'s (2019) study was operationalized according to the Ideal L2 self, which can be understood as a learner's idealized future version of the L2 language user he or she wants to be. The Ideal L2 self is conceptualized within the L2 Motivational Self System (Dörnyei, 2005; Dornyei & Ryan, 2015), the current dominant framework for research on language learning motivation. It has been found to be an important measure of motivation in L2 learning (Taguchi, Magid, & Papi, 2009) as well as in EMI contexts (Lasagabaster, 2016). Nonetheless, Rose et al. (2019) found that motivation did not correlate with higher academic outcomes in EMI programs at a university in Japan. Similarly, Soruç, Pawlak, Yuksel, and Horzum (2022) found no direct relationship between measures of instrumental and intrinsic motivation and success in EMI (although they did find an indirect relationship via the variable of language proficiency). These findings with respect to motivation and academic success contradict research in language learning contexts (see, for example, Iwaniec, 2014), and they call for future research using alterative motivational constructs to explore the role of motivation in EMI contexts that is inclusive of both L2 and wider learning activities.

We thus expand on this approach in our study by incorporating three dimensions of motivation into our analysis: the L2 self-concept (to measure students' self-beliefs of English language abilities), university subjects self-concept (to measure students' self-beliefs of academic content learning abilities), and motivated behaviour (to measure the motivated effort that students apply to their learning). The term *self-concept* can be understood as the beliefs and perceptions that one has about themselves and their competences in a particular area, and it includes both cognitive and affective dimensions (Mercer, 2011). Motivated behaviour refers to the desire, effort, and attitude that a learner has towards learning, and it has been a central concept in models of L2 motivation (Kormos & Csizér, 2008). Although investigated in the field of L2 learning, these constructs have remained underexplored in EMI research. To investigate them further, we have also included a separate research question to address the multi-dimensional construct of motivation.

2.3. Students' self-efficacy

Self-efficacy is "broadly defined as the belief in one's ability to carry out specific tasks successfully" (Graham, 2011, p. 113; see Bandura, 1986). In comparison to self-concept, self-efficacy is context-dependent and domain-specific, relating, for example, to a learner's perceived ability to complete a particular speaking or reading activity (Mercer, 2011). Learners' self-efficacy influences their persistence and the amount of effort they exert on a task, as well as the types of learning activities in which they engage (Graham & Macaro, 2008). In other words, students with greater self-efficacy are more likely to exert more effort on a task and attribute their learning achievement to factors within their control (see Bandura, 2006; Pajares, 1996). Although limited research has been conducted on the relationship between self-efficacy and EMI student challenges, research has established that self-efficacy can predict language learning achievement (Chao, McInerney, & Bai, 2019) and that targeted language support can increase students' confidence in EMI content classes (Chang, Kim, & Lee, 2017). A recent study in China found that students' self-efficacy in listening to EMI lectures predicted their strategy use (Zhou & Rose, 2021), which may in turn facilitate listening comprehension. Soruç et al. (2022) further found L2 self-efficacy to be highly predictive of success in an EMI program at a Turkish university.

Thompson, Aizawa, Curle, and Rose (2019) examined the relationship between students' self-beliefs and their success in an EMI international business course at a university in Japan. Data were collected through direct measures of language and content learning and through a questionnaire (n = 139) and interviews (n = 7) with students. Using multiple regression analysis, the study found that English proficiency, student performance in a preparatory ESP course, and students' self-efficacy predicted their success in the EMI course. The researchers concluded that, due to its predictive power, future EMI studies should incorporate measures of self-efficacy that extend beyond language-related tasks. This call was somewhat addressed in their follow-up study in an EMI finance course in Japan (Thompson, Takezawa, & Rose, 2022), where the researchers integrated concepts such as mathematical self-efficacy into their regression models. Our study also addresses this call by incorporating EMI self-efficacy measures alongside measures of motivation including self-concept and motivated behaviour.

2.4. Language use in EMI classes

Research on EMI classroom language practices has found that the first (or local) language (L1) is commonly used as a pedagogical resource for teaching and learning (Sahan, 2020), although the extent to which teachers use the L1 varies across university settings (Sahan, Rose, & Macaro, 2021). L1 use has been linked to higher levels of teacher-student interaction (Lo & Macaro, 2012) as well as more frequent use of higher order questions (Pun & Macaro, 2019), which may contribute to deeper understanding of content

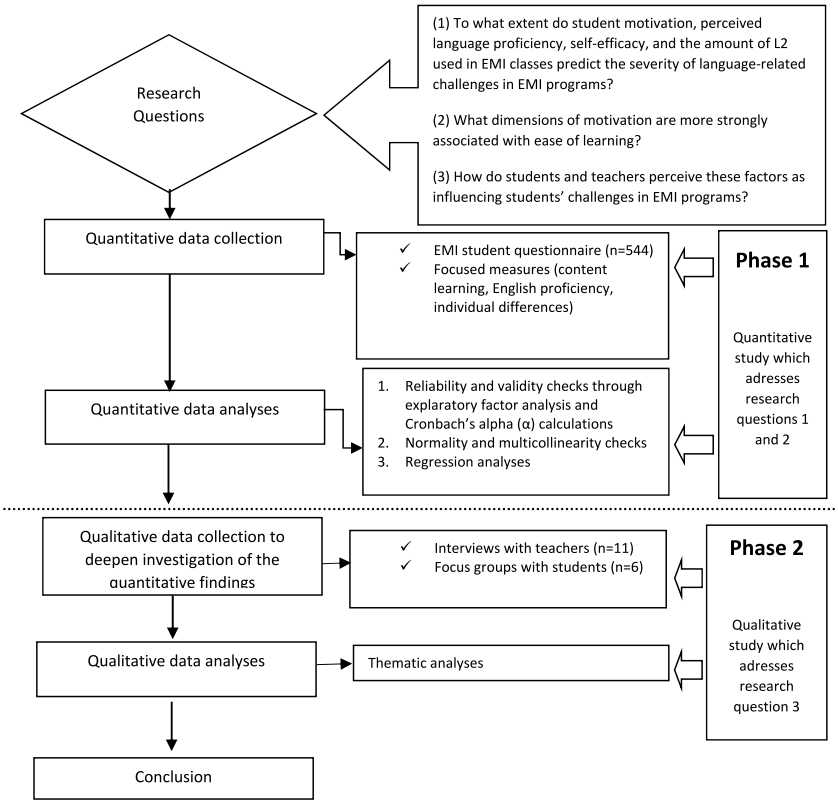

Fig. 1. Research design.

knowledge. Observational research has suggested that the L1 is also used to establish rapport and explain content-specific terminology in EMI classrooms (Tarnopolsky & Goodman, 2014).

Studies investigating students' attitudes toward L1 use have yielded mixed results (Galloway, Kriukow, & Numajiri, 2017), although students generally seem to support the use of the L1 for class discussions (Graham, Eslami, & Hillman, 2021) and to clarify difficult concepts (Sahan, Galloway, & McKinley, 2022). Increasingly, language use in EMI has been approached from a trans-languaging perspective (see Paulsrud et al., 2021), and this growing body of research has highlighted the fluidity of language choice in classroom interaction (Lin & He, 2017; Lin & Wu, 2015; Mazak & Herbas-Donoso, 2015; Tai & Wei, 2021). While this research has highlighted the ways in which the L1 is used to co-construct meaning, research has yet to establish a measurable correlation between L1 use and greater ease of content learning. In other words, the L1 may be used on an *ad hoc* basis rather than as a principled pedagogical practice to mitigate student challenges (Lasagabaster, 2017; Sahan et al., 2021), and further research is needed to establish its potential effect on easing the challenges associated with learning via an L2.

3. Methodology

This study addresses the following research questions:

(1) To what extent do student motivation, self-efficacy, and the amount of L2 used in EMI classes predict the severity of language-related challenges in EMI programs?
(2) What dimensions of motivation are more strongly associated with ease of learning?
(3) How do students and teachers perceive these factors as influencing students' challenges in EMI programs?

To answer the research questions, a multi-layered, mixed-methods approach consisting of a two phase quantitative – qualitative (QUAN → QUAL) sequential research design was employed at a case university (Fig. 1). The investigation commenced with the quantitative strand (hereafter Phase One) in which a questionnaire was distributed to EMI students. The student questionnaire incorporated a battery of focused measures to assess student performance in content learning, English proficiency, and individual differences. The study then continued with the qualitative strand (hereafter Phase Two) in which focus groups (n = 6) with students (n = 24) and semi-structured interviews with teachers (n = 11) were conducted. The qualitative strand allowed for an in-depth exploration of students' and teachers' perceptions of EMI challenges to contextualise the quantitative findings.

Rather than seeking data triangulation, our two-phase mixed-methods research design was underpinned by a *complementary* purpose, drawing on different sources of data, different methodological approaches, and different analyses for purposes of seeking elaboration and clarification from one set of findings to another (Riazi, 2017). This brought greater methodological sophistication by allowing both Phase One and Phase Two to independently draw conclusions based on their own evidence and approaches to research.

3.1. Research setting

The study was conducted at a case university in Istanbul. The case university was a private university which offered undergraduate EMI programs across a range of academic disciplines. English was the official language of instruction at the university. The university provided a suitable context for research because (1) it offered a sufficient number of participants from which to recruit for the quantitative strand of the study and (2) as a private university, it represents a growing global trend among private higher education

Table 1
Participant demographics for the EMI student questionnaire.

Variable	Category	Frequency (N = 544)	Percent
Gender	Male	186	34.2
	Female	347	63.8
	Prefer not to say	11	2.0
First language	Turkish	508	93.4
	Other	43	7.9
Field of study	Arts and Sciences	115	21.1
	Commerce	104	19.1
	Education	82	15.1
	Engineering	55	10.1
	Medical Sciences	51	9.4
	Economics and Administrative Sciences	50	9.2
	Health Sciences or Pharmacy	51	9.4
	Other	36	6.6
Year of study	1st year undergraduate	172	31.6
	2nd year undergraduate	95	17.5
	3rd year undergraduate	110	20.2
	4th year undergraduate	130	23.9
	Other (e.g. 5th year undergraduate; postgraduate)	37	6.8
EMI in secondary school	Yes	175	32.2
	No	369	67.8

institutions (HEIs) to offer EMI programs. Nonetheless, we acknowledge that EMI provision varies greatly from institution to institution, so the findings of the current study are contextually-bound, limiting their generalizability.

Students at the case university are required to demonstrate English language proficiency prior to beginning their EMI courses either by submitting a passing score from an internationally recognized exam or by passing the university's English preparatory program (EPP), which is a one-year intensive course designed to prepare students for academic study in English. The minimum required English proficiency score at the university is a TOEFL IBT 79 or TOEFL PB 550. Students who submit these minimum scores are exempt from the EPP, while all other students are required to take the English Proficiency Test administered by the EPP. The passing score from the English Proficiency Test is 60 out of 100. All of the students who participated in this study had met these proficiency requirements to enrol on their EMI content courses.

3.2. Participants

For Phase One, an online questionnaire was distributed to students through the university e-mailing system. Valid responses from 544 EMI students were collected and analyzed for this study.

Nearly two-thirds (63.8%) of the students were female, and 34.2% of the students were male. Students from more than 11 faculties responded to the questionnaire, and a vast majority of students spoke Turkish as their first language (93.4%). The students were primarily undergraduate students studying in the first (31.6%), second (17.5%), third (20.2%), or fourth year (23.9%). Two-thirds of the students (67.8%) encountered EMI for the first time at university, while the rest (32.2%) had studied academic subjects in English in secondary school. The participant demographics for the EMI students are reported in Table 1. The average TOEFL score reported by the students was 88.65 (n = 26, SD = 18.59); the average score for IELTS was 7.08 (n = 47; SD = 0.99); and the average score for the EPP's English Proficiency Test was 78.97 out of 100 (n = 80; SD = 10.41).

The 11 teachers who were interviewed for Phase Two of the study included seven females and four males, all of whom belonged to a social sciences faculty. It is important to re-iterate that the *complementary mixed methods* approach to Phase Two was not to replicate Phase One qualitatively, but to delve more deeply into a smaller sub-set of the data to complement the findings of the quantitative data (Riazi, 2017). Accordingly, for the qualitative strand of the project, we elected to focus on social sciences, because preliminary analysis of the data found this discipline to be more linguistically-challenging compared to the hard sciences, medical sciences, and engineering (Kamaşak, Sahan, & Rose, 2021b), thus facilitating greater opportunities to explore how such challenges are navigated by students and teachers. Nine of the teachers were local, Turkish teachers who spoke Turkish as a first language, and two were international teaching staff members. One of the international teachers spoke Turkish with advanced proficiency (Teacher 11), while the other did not know Turkish (Teacher 5). The teachers taught tourism, trade and management, finance, computer science, and logistics. Table 2 summarizes the demographic characteristics of the teachers.

In addition to teacher interviews, six focus groups were conducted with students from the social sciences faculty. Each focus group included four students, for a total of 24 students consisting of seven females and 14 males. The participants were predominantly fourth-year undergraduate students (n = 16), although second-year (n = 5) and third-year (n = 3) students also participated in the focus groups. Most of the students had studied for at least one semester in the university's EPP (n = 19) before beginning their EMI courses. Table 3 shows the demographic breakdown of the focus groups.

Ethical clearance was obtained from the case university's Research Ethics Committee prior to data collection. Participation in this study was voluntary, and participants were ensured of anonymity in their responses.

3.3. Data collection tools

The questionnaire included focused measures pertaining to academic challenges, English skills, and motivation. These measures have been used in previous studies which examined success in EMI (Aizawa et al., 2020; Rose et al., 2019; Thompson et al., 2019). The self-administered questionnaire consisted of 77 items including six questions for background details of students. The details of the battery of measures included in the questionnaire are provided below.

Table 2
Teachers who participated in interviews.

Participant number	Gender	Nationality	Academic field
Teacher 1	Male	Turkish	Tourism
Teacher 2	Female	Turkish	Trade, Finance & Management
Teacher 3	Female	Turkish	Trade, Finance & Management
Teacher 4	Female	Turkish	Trade, Finance & Management
Teacher 5	Male	International	Information Systems & Technology
Teacher 6	Female	Turkish	Trade, Finance & Management
Teacher 7	Female	Turkish	Trade, Finance & Management
Teacher 8	Male	Turkish	Trade, Finance & Management
Teacher 9	Male	Turkish	Tourism
Teacher 10	Female	Turkish	Information Systems & Technology
Teacher 11	Female	International	Tourism

Table 3
Focus group student demographics.

Focus group	Number of students	Gender	Year of study	Studied in the EPP
FG 1	4	Female (n = 1), male (n = 3)	2nd Year (n = 2), 4th Year (n = 2)	Yes (n = 4)
FG 2	4	Male (n = 4)	4th Year (n = 4)	Yes (n = 4)
FG 3	4	Female (n = 1), male (n = 3)	2nd Year (n = 2), 4th Year (n = 2)	Yes (n = 3), No (n = 1)
FG 4	4	Female (n = 2), male (n = 2)	2nd Year (n = 1), 4th Year (n = 3)	Yes (n = 2), No (n = 2)
FG 5	4	Female (n = 2), male (n = 2)	3rd Year (n = 1), 4th Year (n = 3)	Yes (n = 4)
FG 6	4	Female (n = 1), male (n = 3)	3rd Year (n = 2), 4th Year (n = 2)	Yes (n = 2), No (n = 2)

a. *Background details of the participants.* The first four items of the questionnaire asked students to report their field of study, year of study, gender and L1. Another two items elicited information pertaining to whether students had studied academic subjects in English prior to university and asked students to report the results of their most recent English language proficiency tests.
b. *Students' academic language challenges (ALC).* Students' academic language challenges were measured by a 43-item questionnaire which was adopted from Evans and Morrison's (2011) scale of student challenges in EMI contexts. The ALC measure consisted of four validated factors of reading, writing, speaking, and listening challenges. The scale has been used to conduct research in different EMI settings, such as Hong Kong (Evans & Morrison, 2011), and has been validated in EMI research in Japan (Aizawa et al., 2020) and Turkey (Kamasak et al., 2021a).
c. *Motivation (MOT).* The questionnaire included 12 items to measure students' learning motivation. The items were adapted from Iwaniec (2014) and measured motivation along three dimensions: (1) L2 self-concept, (2) university subjects self-concept, and (3) motivated behaviour. Each concept was assessed by four items, and each item measured students' responses according to a 7-point Likert-type scale.
d. *Students' EMI self-efficacy (SE).* Students' self-efficacy in EMI were measured using five items which were adopted from Thompson et al. (2019). The five items asked students how confident they were that they could effectively perform academic tasks using English, and responses were recorded along a 7-point Likert-type scale. In developing these items, this study responds to Thompson et al.'s (2019) call for multi-item measures to capture course-specific self-efficacy in EMI programmes. These five items also reflect the domain-specific nature of self-efficacy, as they asked students report their confidence effectively performing specific academic tasks in English.
e. *The amount of English used in EMI classes (L2 Use).* The questionnaire included eight items to assess the amount of L2 used in EMI classes. These items were adopted from Galloway et al. (2017). These items asked students to record the amount of English used in class for various activities on a sliding scale ranging from 0 (*Always Turkish*) to 100 (*Always English*).

3.3.1. Reliability and validity of the research instrument

Exploratory factor analysis (EFA) was used to assess convergent validity of the measures on the questionnaire (see Appendix). The items that loaded on their predicted constructs were examined, and the items with loadings at the 0.50 level or higher was considered as evidence of convergent validity. EFA with VARIMAX rotation yielding five factors resulted in the theoretically expected factor solutions. One item from the L2 use in EMI measure, "my classes use English in exams and assessments" with a loading level of 0.373 was dropped to increase validity of the measure (Hair, Black, Babin, & Anderson, 2009). Two items in the L2 Use measure–"my classes use English in course materials (e.g. textbook, handouts, etc.)" and "my classes use English in PowerPoint slides (or other visuals in class)"–obtained loading scores of 0.447 and 0.441 respectively. Some researchers (i.e. Ahire & Devaraj, 2001; Tabachnick & Fidell, 2007; Maskey & Nguyen, 2018) suggest that factor loadings of 0.4 or greater can be considered as adequate indicators for that factor to maintain the contribution of the construct. Deleting three items from the L2 use in EMI construct was considered to potentially reduce its predictive power, thus, these items were retained. The internal reliability of this factor was $\alpha = 0.840$, which supported this decision. One item from the perceived language proficiency of students, "my English has improved through my EMI courses," had a loading score of 0.355 and was removed, so the analyses continued with 69 items.

The reliability and internal consistency of constructs were assessed by calculating Cronbach's alpha coefficients, and values equal to and above 0.70 were accepted as reliable constructs (Saunders, Lewis, & Thornhill, 2007). The results indicated satisfactory

Table 4
Reliability coefficients of the constructs and scale.

Construct	Cronbach's alpha (α)	% of Variance explained
Motivation – Overall (MOT)	0.886	77.905 (cumulative)
- L2 self-concept (MOT1)	0.915	(26.806)
- Motivated behaviour (MOT2)	0.887	(26.062)
- University subjects self-concept (MOT3)	0.898	(25.037)
EMI Self-efficacy (SE)	0.864	66.350
The amount of L2 use in EMI instruction (L2USE)	0.840	74.663
Academic language challenges - Overall (ALC)	0.980	69.746
Overall scale	0.879	

Table 5
Coding framework of qualitative data.

Theme (in relation to student challenges)	Teacher interviews *Coding frequency (n)*	Student focus groups *Coding frequency (n)*
Students' motivation	39	25
EMI Self-efficacy	30	31
Language use in EMI class	61	43

reliability scores, and the Cronbach's alpha value for each construct is presented in Table 4. The percentage of variance explained for each construct was higher than the commonly acceptable threshold of 60% (Hair et al., 2009). Table 4 also presents the percentage contribution of each motivation subdimension, i.e. MOT1, MOT2 and MOT3, to the overall motivation construct (MOT).

3.4. Data collection and analysis procedures

In Phase One, data were collected through an online questionnaire with a covering letter that included an information sheet and a consent form. The link to the online questionnaire was distributed to students enrolled in EMI programs at the university using the case university's emailing system in December 2020, and a follow-up reminder was sent via email two weeks later. The link to the questionnaire was closed in February 2021. A total number of 544 valid questionnaires were obtained. The questionnaire responses were collected via *Qualtrics*, and data were exported in Excel format and analyzed using the statistical software SPSS 25.0. The data were checked for normality and multicollinearity before regression analysis (Section 4.1).

The interviews and focus groups for Phase Two were conducted online via Zoom by one of the researchers. Interviews and focus groups were semi-structured in nature and lasted approximately 40 min each. The question guides for the interviews and focus groups were similar and covered students' challenges and academic achievement, teaching practices, and language use in EMI classes. The question guides ensured that similar topics were covered during the interviews and focus groups but allowed flexibility for the researcher to ask follow-up questions based on the participants' responses. Participants were invited to respond in the language of their choice (Turkish or English).

Focus groups and interviews were recorded in Zoom, and then transcribed and analyzed in *NVivo*. Each data source was analyzed separately following the procedures for qualitative content analysis (Selvi, 2020). The analysis consisted of both deductive and inductive coding. First, in line with the factors under investigation in this study, three main themes were applied deductively (Table 5):

1. Students' motivation
2. EMI Self-efficacy
3. Language use in EMI classes

Next, after these main themes were applied, the data were analyzed through a process of inductive coding to identify emergent sub-themes. The inductive coding involved an iterative process consisting of multiple rounds of coding, first to identify the sub-themes and then to apply the finalized coding framework. Finally, in line with RQ3, the approach to data analysis sought to investigate how and to what extent participants perceived the three themes as contributing to or mitigating students' challenges in EMI classes.

4. Results

4.1. RQ1: predicting the severity of language challenges

4.1.1. Normality checks

The dataset was checked in terms of normal distribution. In order to confirm normality, descriptive statistics which include skewness and kurtosis were calculated, and Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted. As presented in Table 6, the ranges of skewness and kurtosis were at acceptable levels, indicating normal distribution of data (Saunders et al., 2007).

Highly correlated independent variables may predict each other and lead to inaccurate results in regression analyses (Hair et al., 2009). Therefore, multicollinearity between all variables was tested through an inter-item correlation matrix and any correlation

Table 6
Descriptive statistics from questionnaire.

Construct	MOT	SE	L2USE	ALC
Mean	5.019	5.344	69.929	4.962
Std. Error of Mean	0.047	0.571	0.775	0.511
Median	5.166	5.600	71.125	5.015
Std. Deviation	1.051	1.255	17.115	1.193
Variance	1.104	2.164	29.293	1.424
Skewness	−0.489	−0.749	−0.547	−0.478
Kurtosis	−0.124	−0.142	−0.568	−0.065

Table 7
Multicollinearity.

Constructs	Motivation (MOT)	Self-efficacy (SE)	Amount of English used in EMI (L2USE)	Students' challenges (ALC)	Tolerance	VIF
1. MOT	(0.794)				0.615	1.626
2. SE	0.618**	(0.814)			0.961	1.041
3. L2USE	0.117*	0.199**	(0.775)		0.599	1.668
4. ALC	0.663**	0.740**	0.118**	(0.786)	0.474	2.003

Diagonal value: square root of the AVE.
Non-diagonal value: correlation.
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 8
The results of regression analyses.

	R^2	B	SE B	Standardized Beta (β)	*t*-value	*p* value	ΔF
Constant		0.297	0.218		1.364		
MOT		0.421	0.043	0.368	9.750	<0.001***	
SE		0.488	0.037	0.508	13.299	<0.001***	
L2USE		−0.001	0.002	−0.013	−0.435	0.059	
Model summary	0.622					<0.001***	236.827

Dependent variable: ALC – Students' Academic Language Challenges.
***Significant at the 0.001 level.

coefficient value of 0.80 and above between the variables was examined (Webb, Shavelson, & Haertel, 2006). Accordingly, no construct was perfectly correlated with each other. Moreover, variance inflation factor (VIF), which "quantifies the extent of correlation between one predictor and the other predictors in a model" (Hair et al., 2009, p. 163), were calculated along with tolerance values for each construct to assess the presence of multicollinearity. VIF scores, which should be less than 3.30 (Kock & Lynn, 2012), and tolerance values, which should not be less than 0.10 (Tabachnick & Fidell, 2007), were at satisfactory levels. Thus, the data did not reflect a multicollinearity problem (Table 7), and the necessary assumptions of regression analysis were met.

4.1.2. Multiple regression analyses

Multiple regression analyses were conducted to investigate the predictors of student challenges. As such, the independent variables – which were students' motivation (MOT), EMI self-efficacy (SE), and the amount of L2 used in EMI classes (L2USE) – were regressed on students' academic language challenges (ALC). The results of regression analyses are given in Table 8.

The model explained a statistically significant amount of variance in students' academic language challenges, $F(3, 431) = 236.827$, $p < 0.001$, $R^2_{adjusted} = 0.620$. Motivation ($\beta = 0.368$, $p < 0.001$) and EMI self-efficacy ($\beta = 0.508$, $p < 0.001$) were found to be significant predictors of language challenges. In line with the wording of the questionnaire, the positive association between MOT, SE, and ALC should be interpreted to indicate greater ease of learning (i.e. fewer challenges) as MOT and SE increase. Participants' ease of learning increased 0.421 points for each unit of SD increase on the motivation scale and 0.488 for each unit of SD increase on the EMI self-efficacy scale. Conversely, the negative association between L2 use and ALC implies that the more English is used in the classroom, the more challenges students face, and participants ease of learning decreased by 0.002 points for each unit of SD increase on the L2 use scale; however, the relationship between L2 use and academic challenges was not statistically significant. The independent variables explained 62.2% (Adj. $R^2 = 0.620$; $\Delta F = 236.827$, $p < 0.001$) of the variation in students' academic language challenges. To conclude, L2 use was not found to be a statistically significant predictor of students' academic language challenges, while both motivation and self-efficacy were significant predictors of students' ease of learning.

4.2. RQ2: motivation and ease of learning

For the second research question, we wanted to drill deeper into understanding what type of motivation was more closely related to ease of learning. An EFA analysis of students' motivational constructs revealed the three expected dimensions: (1) L2 self-concept (MOT1), (2) motivated behaviour (MOT2), and (3) university subjects self-concept (MOT3). In order to provide more meaningful

Table 9
Constructs of motivation.

	B	SE B	Standardized Beta (β)	*t*-value	*p* value	Tolerance	Variance Inflation Factor (VIF)
Constant	1.209	0.179		6.753	<0.001***		
MOT1	0.484	0.027	0.607	17.802	<0.001***	0.801	1.245
MOT2	0.041	0.029	0.048	1.412	0.074	0.804	1.239
MOT3	0.200	0.034	0.215	5.817	<0.001***	0.622	1.460

Dependent variable: ALC – Students' Academic Language Challenges ***Significant at the 0.001 level.

insights about the impact of motivation on students' challenges, the three dimensions of motivation were regressed on academic language challenges. The results are presented in Table 9.

The results indicated that only two motivational factors (MOT1 and MOT3) predicted academic language challenges. The predictive power of MOT1 (L2 self-concept) was greater ($\beta = 0.607$, $p < 0.001$) than the predictive power of MOT3 (Subject self-concept) ($\beta = 0.215$, $p < 0.001$). No significant relationship between MOT2 (motivated behaviour) and ALC was observed. In other words, no relationship was found between students' motivated efforts to study in an EMI context and the severity of challenges they faced. In contrast, students' L2 self-concept and university subjects self-concept were found to be associated with ease of EMI, with the former exerting a greater influence.

4.3. RQ3: students' and teachers' perceptions

To answer RQ3, the qualitative data from Phase Two were analyzed to explore how teachers and students in a social science faculty perceived student motivation, self-efficacy, and the amount of L2 English used in EMI classes as influencing students' challenges in EMI programs. The findings illustrate how teachers and students perceived these three factors as inter-related in contributing to students' ease of learning through EMI.

4.3.1. Teacher perceptions

The interview data generally supported a connection between student motivation, EMI self-efficacy, and L2 use: teachers perceived that students who were less likely to participate in L2 English in class were also less likely to be motivated and less likely to display strong EMI self-efficacy, all of which contribute to greater student challenges. The perceived relationship between these three factors and student challenges was summarized by Teacher 1:

> I think the major thing is the speaking part, at the end of the day. The courage. They lack the courage. I'm speaking in general terms, of all students now. The general courage of going in front of a group of people and starting to speak in English. I think if we can break that threshold, you know, that they feel confident enough to just start speaking English. But it's so difficult when in your general life you're not speaking English at all, and then you have to go in front of people and start speaking English. And I can understand that …. But some of them are just too lazy, maybe. Some of them are like, you know, when I graduate, I'll just take over my father's business, you know? Why make this effort?

Teachers perceived that students who lacked confidence communicating in English (SE) were less likely to participate in English in class (L2 USE), and they perceived this lack of engagement as both contributing to and resulting from low student motivation (MOT), which in turn negatively impacted the effort that students put into their EMI classes.

Many teachers perceived motivation as the most important factor contributing to students' success in their EMI classes. Specifically, the teachers perceived that a lack of motivation *to learn English* and *to study the academic subject* contributed to students' challenges because it decreased the amount of effort students put into their studies. Teacher 9 argued that students "forget about English language learning" after the preparatory program, leading to challenges following lectures in English. He described how he used to run a lunchtime speaking club focused on learning English idioms but cancelled the club due to lack of interest: "Unfortunately, I thought I would have an [amphitheater] of people, a hundred students. But no more than 10 came" (Teacher 9). Teachers also perceived that a lack of interest in the academic subject contributed to students challenges. As one teacher described: "Many students are in a program that they are really not interested in. They are there because their family wants them there," and these students are content with "a minimum passing grade" (Teacher 4).

These findings support the quantitative results, which revealed a statistically significant relationship between L2 self-concept and student challenges. However, they also suggest that teachers perceived a relationship between motivation and the amount of effort students put into their classes–though the quantitative findings did not reveal a significant relationship between motivated behaviour and students' challenges. The perceived link between motivation and ease of student learning is illustrated in the follow excerpt:

> Sometimes they are just not interested in putting in the effort because if they find something interesting–I mean you can see the quality improve suddenly. If they find something interesting, suddenly they can do a lot more work. And if they are bored with something, then it's an English problem, it's a language problem, it's a computer problem, math problem, everything starts. (Teacher 5)

Thus, while the quantitative findings did not reveal a statistically significant relationship between motivated behaviour and student challenges, the teachers perceived that students' ease of learning increased when they were interested in the subject material because 'they can do a lot more work'.

Similarly, the teachers noted that students with lower self-efficacy were less likely to spend time preparing for their EMI courses (e.g., completing assigned reading or homework before class) or studying English outside of class. In general, the teachers perceived an overreliance on memorization, with some stating that students memorized sentences from their textbooks and wrote them verbatim on exams (Teachers 4, 5, and 9). Other teachers (Teacher 6 & Teacher 8) perceived that students were too reliant on the internet for quick answers, which hindered their critical thinking skills. Teacher 6 gave the example of a student relying on Google translate without

checking for accuracy:

> I gave them a project last semester. And I get those project reports, and there was something called, 'Sunday share' there. I was thinking, 'what is Sunday share?' Is this something in finance that I haven't heard of? Turns out it was just market share.[1] And Google translate just translates it as Sunday share. It took me like twenty minutes to understand that it was just market share.

As illustrated in this example, the student relied on an automatic translation tool without checking whether the word *pazar* (meaning both 'market' and 'Sunday') had been accurately translated. From these examples, the interview data suggest that low student self-efficacy, in terms of ability to study and complete tasks in English, may contribute to greater challenges through less effort and critical engagement with course content, and a greater reliance 'shortcuts' such as memorization and automated translation software.

These findings support the quantitative analysis, in which motivation and self-efficacy were significant predictors of student challenges, while L2 use was not. In the interview data, teachers' perceptions of L2 use and students' challenges provided further nuance in terms of how L2 use might contribute to students' ease of learning. All 11 teachers perceived L2 use as contributing to student challenges because students were reluctant to speak English in class, and therefore less likely to participate in class discussions or ask and answer questions. Teacher 3 and Teacher 11 emphasized the importance of interactive pedagogy and stated that students who were reluctant to participate in English were less engaged in class. As Teacher 10 summarized, if students are reluctant to participate in English, "then they are not asking questions, just listening. And that kind of student is actually, they don't have good GPAs at the end. So, they are not able to ask questions, they are keeping silent in the class." Teachers perceived the relationship between L2 use and students' challenges, therefore, as more nuanced than simply affecting students' ability to comprehend academic content in English; L2 use was perceived as contributing to low student engagement, which in turn affected the quality of learning.

To overcome these concerns, nine of the 11 teachers used L1 Turkish to facilitate class discussion and encourage participation. Only the two international teachers (Teacher 5 & Teacher 11) stated that they never used Turkish in class. One teacher (Teacher 7) explained her approach to L1 use in class discussion: "They are free to join in Turkish because if I do not let them do so, they will never participate." Some teachers (Teacher 3 & Teacher 8) perceived students' reluctance to participate in English as the result of peer pressure and a fear of speaking English, suggesting affective barriers to EMI learning—a theme which was also evident in the student focus groups.

4.3.2. Student perceptions

Similar to the data collected from teacher interviews, the focus group data from students revealed a perceived connection between motivation, self-efficacy, and L2 use in EMI classes. A key theme to emerge from the focus group data was students' perception of L2 English learning: the students who participated in this study did not believe that it was possible for them to learn or use English effectively in an educational setting in Turkey. Instead, they believed that learners needed to go abroad, or be in an immersive setting surrounded by non-Turkish speakers, in order to improve their English. One student summarized: "English development isn't something that can happen at school. Because, at school, we're trying to pass something, not trying to learn something. That's why going abroad to a language course can be more effective" (S3, FG4). Another student compared his English development while on holiday in Greece with his experience learning at school: "I reached another level in two or three days, but at school, if I spoke for a year, I wouldn't reach that level" (S3, FG1).

The perception that English is best learned 'abroad' also appeared to affect students' EMI self-efficacy, as they did not believe that it was possible for them to complete the academic tasks in English, in Turkey, unless international teachers and students were present. One student stated:

> If the teacher asks, 'should I do it in Turkish or English?', generally the students say do it in Turkish. But if the teacher doesn't ask—for example, there are foreign teachers, and they do their lessons in English—if you ask me, those lessons build up our self-confidence because it's impossible to communicate with the teacher in another language. When that happens, there's a mutual interaction, and I think this gives us self-confidence. (S3, FG1)

As illustrated by the excerpt, the students believed that it was difficult to carry out academic tasks, like group discussion, in English, but that interacting with non-Turkish speakers was necessary to build confidence. Notably, the students did not consider L2 English interactions with Turkish teachers or classmates as 'mutual interactions' capable of 'building self-confidence.' In part, this perception appeared to be due to affective factors and fears of communicating in English, which led to L2 use as influencing challenges in EMI programs. As one student described: "There's actually nothing to be afraid of. When you don't panic, you understand the teacher" (S2, FG1). Students across focus groups reported that the initial 'panic' of having to use English in class created challenges, especially in the first year. In contrast to these fears of using English, students perceived that L1 use led to ease of learning because "Turkish is easier for us to understand" (S3, FG6).

Moreover, students across focus groups described peer pressure as preventing them from speaking English in class. One student explained, "my friends laughed at me when I tried to speak English …. After that, we're hesitant to speak" (S1, FG3). Similarly, another student described facing opposition from his peers for asking their EMI teacher to speak English in class: "They said, why are you saying that? It is easier in Turkish, why do you want to make it so hard? Nobody understood me so I just stopped [asking for English]" (S1,

[1] In Turkish, the word *pazar* can be translated as both 'market' and 'Sunday.'

FG5). These examples were used by students in focus groups to reinforce the perception that learning activities cannot be successfully conducted in English in their EMI class.

In addition to affective factors, students' low self-efficacy with respect to completing academic tasks in English may have arisen from the gap that students' perceived between the English they were taught in the preparatory program (which they described as general academic English with a focus on grammar) and the English they needed in their EMI classes (which they described as speaking and listening, with discipline-specific terminology). As a result of this gap, some students felt unprepared and unable to cope with the linguistic demands of EMI.

The perception that English cannot be learned in Turkey may suggest, on one level, that students were not highly motivated to study English—however, this stands in contrast to their reported motivations for enrolling to EMI programs: across focus groups, students stated that they were primarily motivated by a need for English in their future careers. As one student summarized: "In the future when we've graduated, I won't be able to work at an international company if I don't know a foreign language" (S2, FG1). This finding supports the results of the quantitative analysis in which L2 self-concept (MOT1) was found to predict ease of learning. However, despite this reported motivation to learn English for their careers, students in three focus groups (FG4, FG5 & FG6) described themselves as 'lazy' (e.g., "I am lazy, I don't like to study," S3, FG6), suggesting a relationship between motivated behaviour and challenges—although a significant relationship was not found in the quantitative analysis.

In terms of self-efficacy, students expressed confidence in their ability to *pass their EMI courses* but not in their *ability to complete academic tasks* in English. The students reported that they could pass their EMI classes "just by memorizing" (S3, FG1), "paraphrasing the textbook" (S1, FG4), and "finding the keywords to the exams" (S3, FG5). However, they were less confident in their ability to complete EMI learning activities in English. A student who asserted, "we can pass easily" (S1, FG5), also stated:

> Nobody can learn a foreign language in their home country …. It is a matter of practice. We can't practice in Turkey. Whenever we speak, people laugh at our accents, pronunciation and we are shy about it. (S1, FG5)

Thus, while this student believed it was easy to pass, he also believed that there were significant educational and affective barriers to completing academic tasks (such as joining discussions) in English. These findings suggest that students who believe they are capable of completing academic tasks in English, in Turkey, may experience less EMI-related challenges because they may be more likely to put in effort to understand their courses in English and overcome affective barriers to L2 use. However, more research is needed to explore these emerging ideas in relation to EMI self-efficacy.

5. Discussion and conclusions

5.1. Heightened self-efficacy and translanguaging may mitigate language challenges

In terms of research question one, self-efficacy was found to be associated with greater ease of EMI learning, as measured by the severity of academic language challenges. That is, more efficacious and motivated learners experienced fewer challenges. The predictive power of self-efficacy in EMI found in this study adds to previous positive relationships found with academic performance (Thompson et al., 2019) and strategy use (Zhou & Rose, 2021). The EMI SE measure in our regression model further supports directions in previous research that go beyond L2 measures in EMI research (Thompson et al., 2022). The complexity of EMI self-efficacy was illustrated in the focus group findings, in which students expressed confidence in their ability to pass EMI classes but not in their ability to complete academic tasks in English or learn English 'at school.' These findings suggest that measures of self-efficacy in EMI ought to consider quality of learning and learning activities, rather than final marks alone.

The quantitative findings also identified a possible predictive relationship between the amount of English used and the severity of challenges, albeit at a lower confidence interval. That is, the use of Turkish in EMI was associated with fewer academic challenges in the L2. The qualitative findings also suggested students preferred the use of the L1 to assist in their learning and that teachers viewed the L1 as an important pedagogical resource. These findings with respect to L1 use in EMI classes support other studies in the literature which have highlighted the benefits of translanguaging or plurilingual pedagogies in EMI classrooms (e.g., Lin & He, 2017; Paulsrud, Tian, & Toth, 2021; Sahan, 2020), and the findings join others (Curle et al., 2020) in supporting a multilingual model of EMI in which the L1 is used alongside English for teaching and learning. One key difference between the findings from our study and Curle et al.'s (2020) is that Curle et al. were looking at Turkish medium classes that were separate from EMI classes (e.g., some EMI and some TMI classes), whereas we found that L1 use *in* EMI classes might mitigate student challenges. Our focus group and interview data also revealed a more nuanced picture of the perceived relationship between language use and student challenges, as teachers and students identified potential benefits arising from L1 use. Once again, these findings suggest that a multilingual model which moves away from English-only instruction (or alternatively, Turkish-only instruction) would be beneficial for reducing challenges to content learning in EMI courses.

Moreover, the qualitative findings in Phase Two indicated that many students and teachers saw the benefits of EMI beyond the realms of the classroom (i.e., for preparation of English-medium work environments). These results indicate EMI language policies need not only to consider their impact on academic learning activities, but also the wider needs of the program, especially considering many Turkish EMI students are primarily driven to undertake EMI studies by a desire to enhance their career prospects and improve their English language skills (Sahan & Şahan, 2021; Kirkgöz, 2005). The implications from this are that universities and teacher training should encourage interactive EMI pedagogies, which allow for *moderated* use of the L1 to facilitate teaching and learning of content, without being disruptive to the perceived benefits of EMI in terms of allowing students to engage with disciplinary knowledge in the L2.

5.2. Self-concept may be an important motivational variable in EMI

In regards to the second research question, the findings showed motivation in EMI to be multi-faceted and predictive of challenges. While motivation in previous EMI studies was measured in relation to the ideal L2 self (Rose et al., 2019), instrumentality and intrinsic motivation (Soruç et al., 2022), we used measures of motivation related to self-concept, concluding that the L2 self-concept was strongly correlated with challenges in EMI. In other words, we found that as students' L2 self-concept increased, they experienced greater ease in EMI. While previous research used exam scores as their outcome variable, our findings nonetheless contradict findings that L2 motivation is of lesser importance in EMI. These results have research implications for exploring motivation in EMI, insofar that if researchers do not look at wider measures of motivation, they may miss important links between motivation and learning in EMI contexts.

Taken together, our findings on EMI self-efficacy and motivational constructs related to self-concept highlight the importance of building students' self-beliefs in EMI. Thompson et al. (2019) found that specially-tailored ESP courses offered at their case university raised students' self-efficacy to perform the academic tasks required of them in their English-medium content classes. In our current study, we did not find such evidence from the EPP, and instead students noted gaps such as a lack of speaking practice leading to a lack of confidence in using spoken English in EMI classrooms. Our findings from student focus groups have also suggested that students' perceptions about the difficulties of learning L2 English 'at school' may contribute to low EMI self-efficacy. In Thompson et al. (2019), the ESP course was reported as closely related to students' EMI content courses, designed in collaboration with content teachers, and ran simultaneously to students' first English-medium course. This suggests that students may benefit from more ESP-focused language support, instead of the separate, general academic English program offered in the year preceding EMI enrolment. As academic requirements differ from discipline to discipline, English support courses would benefit from being underpinned by genre analysis and genre-based pedagogies (see Wingate & Hakim, 2022), and produced in collaboration with subject specialists vis-à-vis the context described in Thompson et al. (2019).

Finally, a potentially alarming finding to emerge from the focus group data was the belief that English could only be learned or used 'abroad' with 'international' people. In pursing activities to heighten EMI students' self-beliefs, particular attention should be paid to role of English as a global language and the potential for English to be learned and used in the local context.

5.3. Recommendations for future research

While our findings highlight important relationships between student self-beliefs and academic language challenges, some care needs to be taken in interpreting the results. First, the context of our study is institutionally-bound, thus the results may differ in other types of institutions with different entry requirement, support structures, and student profiles. Furthermore, following the study's complementary mixed methods design, data for the qualitative strand were collected from a sub-set of participants in a social science faculty. As such, our findings with respect to students' and teaches' perceptions of the factors influencing students' challenges relate specifically to this sub-set of participants, and they do not reflect cross-disciplinary differences that might be found in the hard science, medical sciences, or engineering. As the sample of our qualitative phase was limited to the social sciences, we might also discover, via future research, that the experiences of students in other disciplines differ in terms of the interplay between self-beliefs and academic challenges. Nonetheless, we can conclude that this study adds to a growing body of evidence on the importance of providing students with self-efficacy raising tasks to nurture their ability to tackle EMI-related academic activities. The next step will be to investigate what these tasks should look like by examining best practices of language support, and underpinning such practices with knowledge from relevant EAP and ESP domains.

Our findings also have unpicked some of the complexities surrounding L2 motivation in EMI by indicating, contrary to previous studies, that some domains of motivation appear to be related to EMI activities. The findings especially point to the importance of including both language-related and wider motivational items within motivational measures, because EMI students are driven by more than just language-learning goals. The lack of significance of 'motivated behaviour' in our quantitative analysis may also be related to the narrowness of the construct itself, as we found evidence in the qualitative data to suggest that teachers and students perceived a relationship between motivated behaviour and academic challenges. Future research may want to widen the lens by exploring constructs as nebulous as 'effort' via alternative theories from educational psychology such as the perseverance scale in GRIT-S (see Duckworth & Quinn, 2009). By better understanding the relationship between student self-beliefs and challenges, universities may be able to offer more targeted support for students enrolled to EMI programs.

Author statement

Kari Sahan: Conceptualisation, Project administration, Methodology, Investigation, Formal Analysis, Data curation, Writing – original draft, Writing - Review & Editing, Funding acquisition.

Rifat Kamasak: Conceptualisation, Project administration, Methodology, Investigation, Formal Analysis, Data curation, Writing – original draft, Funding acquisition.

Heath Rose: Conceptualisation, Methodology, Supervision, Writing – original draft, Writing - Review & Editing, Funding acquisition.

Acknowledgements

We would like to thank the British Council for funding this project through the 'New Connections in EMI Turkey Research Partnership Fund 2020'.

APPENDIX

Items of the questionnaire, constructs and factor loadings

Items	F1:WC (0.952)	F2:SC (0.956)	F3:LC (0.961)	F4:RC (0.945)	F5:L2USE (0.840)	F6:SE (0.864)
Writing the introduction to an assignment	0.687					
Writing the body of an assignment	0.777					
Writing the conclusion to an assignment	0.709					
Linking sentences smoothly	0.794					
Writing a bibliography/references section	0.647					
Using appropriate academic style	0.754					
Organising ideas in coherent paragraphs	0.784					
Planning written assignments	0.769					
Summarising/paraphrasing ideas in sources	0.752					
Expressing ideas clearly and logically	0.791					
Linking ideas from different sources	0.804					
Revising written work	0.752					
Referring to sources in written work	0.708					
Proofreading written work	0.736					
Communicating ideas fluently		0.895				
Participating actively in discussion		0.855				
Communicating ideas confidently		0.869				
Asking questions		0.806				
Answering questions		0.850				
Presenting information/ideas		0.862				
Speaking from notes		0.738				
Speaking accurately (grammar)		0.699				
Speaking clearly (pronunciation)		0.809				
Using visual aids (e.g. PowerPoint)		0.582				
Taking brief, clear notes			0.814			
Understanding the main ideas of lectures			0.854			
Understanding the overall organisation of lectures			0.859			
Understanding key vocabulary			0.845			
Identifying different views and ideas			0.874			
Identifying supporting ideas and examples			0.894			
Understanding questions			0.869			
Following a discussion			0.846			
Understanding lecturers' accents			0.762			
Understanding classmates' accents			0.660			
Reading quickly to get overall meaning				0.807		
Reading quickly to find specific information				0.825		
Reading carefully to understand a text				0.809		
Identifying the key ideas of a text				0.844		
Understanding specific vocabulary				0.728		
Identifying supporting ideas and examples				0.835		
Working out the meaning of difficult words				0.717		
Understanding the organisation of a text				0.805		
Taking brief, relevant notes				0.716		
Discussing classwork with classmates					0.729	
Asking the teacher questions					0.519	
Taking part in whole-class discussions					0.733	
Answering the teacher's questions					0.735	

(*continued on next page*)

(*continued*)

Items	F1:WC (0.952)	F2:SC (0.956)	F3:LC (0.961)	F4:RC (0.945)	F5:L2USE (0.840)	F6:SE (0.864)
Lectures					0.664	
Course materials (e.g. textbook, handouts, etc.)					0.447	
PowerPoint slides (or other visuals in class)					0.441	
Exams and assessments					***0.373**	
Participate in class discussions						0.599
Understand the textbook content						0.722
Complete the assignments and tests						0.702
Understand the lecture materials presented by the instructor						0.738
Ask questions to the instructor						0.710

Items	F8: MOT1(0.915)	F9: MOT2(0.887)	F10:MOT3(0.898)
I usually get good marks in English	0.876		
I have always done well in English	0.869		
Studying English comes easy to me	0.866		
Compared to other students I'm good at English	0.860		
I spend lots of time studying for my lessons		0.873	
I am working hard in my lessons		0.873	
I am prepared to put a lot of effort into my lessons		0.849	
I'm doing my best to perform well in my lessons		0.814	
I usually get good marks in my university subjects			0.857
Compared to other students I'm good at my university subjects			0.850
I have always done well in my university subjects			0.820
Studying my university subjects comes easy to me			0.756
Kaiser-Meyer-Olkin Sampling Adequacy		0.951	
Barttlet's Test of Approx. Chi-Square Sphercity		26713.509***	
Overall reliability of the scale (α = 0.883)			

***P < 0.001

*Dropped items.
Cronbach's alpha (α) values are in parentheses.
WC: Writing Challenges.
SC: Speaking Challenges.
LC: Listening Challenges.
RC: Reading Challenges.
MOT: Motivation.
L2USE: The amount of L2 used in EMI instruction.
SE: Self-efficacy.

References

Ahire, S. L., & Devaraj, S. (2001). An empirical comparison of statistical construct validation approaches. *IEEE Transactions on Engineering Management, 48*(3), 319–329.

Aizawa, I., Rose, H., Thompson, G., & Curle, S. (2020). *Beyond the threshold: Exploring English language proficiency, linguistic challenges, and academic language skills of Japanese students in an English medium instruction programme.Language Teaching Research.* https://doi.org/10.1177/1362168820965510

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology, 4*(3), 359.

Bandura, A. (2006). Guide for constructing self-efficacy scales. In F. Pajares, & T. C. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 307–337). Information Age.

Chang, Y. Y. (2010). English-medium instruction for subject courses in tertiary education: Reactions from Taiwanese undergraduate students. *Taiwan International ESP Journal, 2*(1), 53–82.

Chang, J. Y., Kim, W., & Lee, H. (2017). A language support program for English-medium instruction courses: Its development and evaluation in an EFL setting. *International Journal of Bilingual Education and Bilingualism, 20*(5), 510–528.

Chao, C. N. G., McInerney, D. M., & Bai, B. (2019). Self-efficacy and self-concept as predictors of language learning achievements in an Asian bilingual context. *The Asia-Pacific Education Researcher, 28*(2), 139–147.

Curle, S., Yuksel, D., Soruç, A., & Altay, M. (2020). Predictors of English medium instruction academic success: English proficiency versus first language medium. *System, 95*, Article 102378.

Dafouz, E., Camacho, M., & Urquia, E. (2014). 'Surely they can't do as well': A comparison of business students' academic performance in English-medium and Spanish-as-first-language-medium programmes. *Language and Education, 28*(3), 223–236.

Doiz, A., Lasagabaster, D., & Sierra, J. M. (2014). CLIL and motivation: The effect of individual and contextual variables. *Language Learning Journal, 42*(2), 209–224. https://doi.org/10.1080/09571736.2014.889508

Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition.* Routledge.

Dornyei, Z., & Ryan, S. (2015). *The psychology of the language learner revisited*. Routledge.
Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (GRIT–S). *Journal of Personality Assessment, 91*(2), 166–174.
Evans, S., & Green, C. (2007). Why EAP is necessary: A survey of Hong Kong tertiary students. *Journal of English for Academic Purposes, 6*(1), 3–17.
Evans, S., & Morrison, B. (2011). Meeting the challenges of English-medium higher education: The first-year experience in Hong Kong. *English for Specific Purposes, 30*(3), 198–208.
Galloway, N., Kriukow, J., & Numajiri, T. (2017). Internationalisation, higher education and the growing demand for English: An investigation into the English medium of instruction (EMI) movement in China and Japan. *British Council Teaching English*. https://www.teachingenglish.org.uk/article/internationalisation-higher-education-growing-demand-english-investigation-english-medium.
Graham, S. (2011). Self-efficacy and academic listening. *Journal of English for Academic Purposes, 10*(2), 113–117. https://doi.org/10.1016/j.jeap.2011.04.001
Graham, K. M., Eslami, Z. R., & Hillman, S. (2021). From English as the medium to English as a medium: Perspectives of EMI students in Qatar. *System, 99*, Article 102508.
Graham, S., & Macaro, E. (2008). Strategy instruction in listening for lower-intermediate learners of French. *Language Learning, 58*(4), 747–783.
Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). Prentice Hall.
Hellekjær, G. O. (2010). Lecture comprehension in English-medium higher education. *HERMES-Journal of Language and Communication in Business, 45*, 11–34.
Iwaniec, J. (2014). Motivation of pupils from southern Poland to learn English. *System, 45*, 67–78. https://doi.org/10.1016/J.SYSTEM.2014.05.003
Kamasak, R., & Ozbilgin, M. F. (2021). English medium instruction (EMI): Is it a vehicle to achieve linguistic and content knowledge or a marketing tool in higher education? In B. Christiansen, & J. Branch (Eds.), *The marketisation of higher education: Practices and policies* (pp. 321–341). London, UK: Palgrave Macmillan.
Kamasak, R., Sahan, K., & Rose, H. (2021a). Academic language-related challenges at an English-medium university. *Journal of English for Academic Purposes, 49*(1), 1–16.
Kamaşak, R., Sahan, K., & Rose, H. (2021b). Quality of Instruction and Student Outcomes in English-medium Programs in Turkey. In *New Connections in EMI Turkey Research Partnership Fund 2020* (pp. 204–229). British Council. https://www.britishcouncil.org.tr/sites/default/files/emi_research_partnership_fund_final_report_0.pdf.
Kırkgöz, Y. (2005). Motivation and student perception of studying in an English-medium university. *Journal of Language and Linguistic Studies, 1*(1), 101–123.
Kock, N., & Lynn, G. S. (2012). Lateral collinearity in SEM. *Journal of the Association for Information Systems, 13*(7), 546–580.
Kormos, J., & Csizér, K. (2008). Age-related differences in the motivation of learning English as a foreign language: Attitudes, selves, and motivated learning behavior. *Language and learning, 58*(2), 327–355. https://doi.org/10.1111/j.1467-9922.2008.00443.x
Lasagabaster, D. (2016). The relationship between motivation, gender, L1 and possible selves in English-medium instruction. *International Journal of Multilingualism, 13*(3), 315–332. https://doi.org/10.1080/14790718.2015.1105806
Lasagabaster, D. (2017). 'I always speak English in my classes': Reflections on the use of the L1/L2 in English-medium instruction. In A. Llinares, & T. Morton (Eds.), *Applied linguistics perspectives on CLIL* (pp. 259–275). John Benjamins.
Lin, A. M., & He, P. (2017). Translanguaging as dynamic activity flows in CLIL classrooms. *Journal of Language, Identity and Education, 16*(4), 228–244.
Lin, A. M., & Wu, Y. (2015). 'May I speak Cantonese?'–Co-constructing a scientific proof in an EFL junior secondary science classroom. *International Journal of Bilingual Education and Bilingualism, 18*(3), 289–305.
Lo, Y. Y., & Macaro, E. (2012). The medium of instruction and classroom interaction: Evidence from Hong Kong secondary schools. *International Journal of Bilingual Education and Bilingualism, 15*(1), 29–52.
Macaro, E. (2018). *English medium instruction*. Oxford University Press.
Macaro, E., Curle, S., Pun, J., An, J., & Dearden, J. (2018). A systematic review of English medium instruction in higher education. *Language Teaching, 51*(1), 36–76.
Maskey, J. F., & Nguyen, H.-O. (2018). Use of exploratory factor analysis in maritime research. *The Asian Journal of Shipping and Logistics, 34*(2), 91–111.
Mazak, C. M., & Herbas-Donoso, C. (2015). Translanguaging practices at a bilingual university: A case study of a science classroom. *International Journal of Bilingual Education and Bilingualism, 18*, 698–714.
Mercer, S. (2011). *Towards an understanding of language learner self-concept*. Springer.
Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*(4), 543–578. https://doi.org/10.3102/00346543066004543
English-medium instruction and translanguagingPaulsrud, B., Tian, Z., & Toth, J. (Eds.). *Multilingual Matters*, (2021).
Pun, J., & Macaro, E. (2019). The effect of first and second language use on question types in English medium instruction science classrooms in Hong Kong. *International Journal of Bilingual Education and Bilingualism, 22*(1), 64–77.
Riazi, A. M. (2017). *Mixed methods research in language teaching and learning*. Equinox Publishing.
Rose, H., Curle, S., Aizawa, I., & Thompson, G. (2019). What drives success in English medium taught courses? The interplay between language proficiency, academic skills, and motivation. *Studies in Higher Education*. https://doi.org/10.1080/03075079.2019.1590690
Sahan, K. (2020). ELF interactions in English-medium engineering classrooms. *ELT Journal, 74*(4), 418–427.
Sahan, K., Galloway, N., & McKinley, J. (2022). 'English-only'English medium instruction: Mixed views in Thai and Vietnamese higher education. *Language Teaching Research*. https://doi.org/10.1177/13621688211072632
Sahan, K., Rose, H., & Macaro, E. (2021). Models of EMI pedagogies: At the interface of language use and interaction. *System, 101*, Article 102616.
Sahan, K., & Şahan, Ö. (2021). Investigating student and alumni perspectives on language learning and career prospects through English medium instruction. *Teaching in Higher Education*, 1–22. https://doi.org/10.1080/13562517.2021.1973407
Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research methods for business students* (4th ed.). Essex, UK: Pearson Education.
Selvi, A. F. (2014). The medium-of-instruction debate in Turkey: Oscillating between national ideas and bilingual ideals. *Current Issues in Language Planning, 15*(2), 133–152.
Selvi, A. F. (2020). Qualitative content analysis. In J. McKinley, & H. Rose (Eds.), *Routledge handbook of research methods in applied linguistics* (pp. 440–452). Routledge.
Soruç, A., & Griffiths, C. (2018). English as a medium of instruction: Students' strategies. *ELT Journal, 72*(1), 38–48.
Soruç, A., Pawlak, M., Yuksel, D., & Horzum, B. (2022). Investigating the impact of linguistic and non-linguistic factors on EMI academic success. *System, 107*, Article 102794.
Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Pearson Education.
Taguchi, T., Magid, M., & Papi, M. (2009). The L2 motivational self system among Japanese, Chinese and Iranian learners of English: A comparative study. In Z. Dörnyei, & E. Ushioda (Eds.), *Motivation, language identity and the L2 Self* (pp. 66–97). Bristol: Multilingual Matters.
Tai, K. W., & Wei, L. (2021). Constructing playful talk through translanguaging in English medium instruction mathematics classrooms. *Applied Linguistics, 42*(4), 607–640.
Tarnopolsky, O. B., & Goodman, B. A. (2014). The ecology of language in classrooms at a university in eastern Ukraine. *Language and Education, 28*, 383–396.
Thompson, G., Aizawa, I., Curle, S., & Rose, H. (2019). Exploring the role of self-efficacy beliefs and learner success in English medium instruction. *International Journal of Bilingual Education and Bilingualism*, 1–14.
Thompson, G., Takezawa, N., & Rose, H. (2022). Investigating self-beliefs and success for English medium instruction learners studying finance. *The Journal of Education for Business, 97*(4), 220–227.
Webb, N. M., Shavelson, R. J., & Haertel, E. H. (2006). Reliability coefficients and generalizability theory. In C. R. Rao, & S. Sinharay (Eds.), *Handbook of statistics: Psychometrics* (vol. 26, pp. 81–124). Amsterdam, The Netherlands: Elsevier B. V.
Wingate, U., & Hakim, A. (2022). Moving beyond 'infancy': Towards a cross-fertilisation between EMI and EAP. *ELT Journal* (in press).

Xie, W., & Curle, S. (2022). Success in English medium instruction in China: Significant indicators and implications. *International Journal of Bilingual Education and Bilingualism, 25*(2), 585–597.

Yıldız, M., Soruç, A., & Griffiths, C. (2017). Challenges and needs of students in the EMI (English as a medium of instruction) classroom. *Konin Language Studies, 5*(4), 387–402.

Zhou, S., & Rose, H. (2021). Self-regulated listening of students at transition from high school to an English medium instruction (EMI) transnational university in China. *System, 103*, Article 102644.