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Article

How Do EMI Lecturers' Translanguaging Perceptions Translate into Their Practice? A Multi-Case Study of Three Chinese Tertiary EMI Classes

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Abstract: Translanguaging is discussed widely in the literature as a new pedagogical tool for English-medium instruction (EMI) that can challenge monolingual assumptions, mitigate English language barriers, and advocate for the full use of linguistic resources in meaning making. Different EMI lecturers have been found to hold diverse translanguaging perceptions and have adopted a variety of its functions. However, more needs to be known to close the knowledge gap between how each lecturer envisions and practices their translanguaging pedagogies, if any. Employing a qualitative method using data from semi-structured interviews and classroom observation, this study investigated three Chinese tertiary EMI engineering lecturers' translanguaging perceptions and practices. Taken together, these three cases illustrate the complex relationship between translanguaging perceptions and practices according to their interactional (e.g., students' difficulties in understanding full EMI), socio-cultural (e.g., the socially constructed value of full EMI), and personal factors (e.g., EMI teaching experiences). We propose that the negotiation among these three domains can promote or withhold the transfer of translanguaging perceptions into practice. We use our findings to call for EMI training programs to encourage lecturers' reflections regarding what languages are or can be used in EMI classrooms and how and why from socio-cultural, personal, and interactional perspectives.

Keywords: translanguaging and EMI; lecturers' translanguaging perception; lecturers' translanguaging practice; lecturers' perception and practice; EMI in Chinese higher education



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1. Introduction

Macaro [1] defined English-medium instruction (EMI) as 'the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions where the first language (L1) of the majority of the population is not English' (p. 37). EMI is developing exponentially in higher education globally [2], including in China, where constituent policy support and financial aid have led to a prevailing increase in EMI courses in recent decades [3]. Learning content knowledge is an explicit and major objective and learning the English language is also suggested as an implicit teaching objective in EMI classrooms [4]. However, language-related issues have been extensively revealed in EMI tertiary programs because both lecturers and students are generally non-native English speakers who are not exposed to English-speaking environments in both their academic and day-to-day contexts [5]. This includes students' difficulties in learning content knowledge through the medium of English and their resulting psychological distress and anxiety, in addition to lecturers' limited English communication skills and their perceived lack of responsibility for addressing students' language needs [6–8]. In EMI science classrooms, students and teachers could encounter additional language-related challenges brought on by the nature of science language, which involves specialized lexico-grammatical features, a

wide scope of technical terms [9], and non-technical vocabulary with unique contextualized meaning [10].

To tackle these issues, translanguaging pedagogies, which were initially suggested to dismantle the artificial meaning-making boundaries between languages in bilingual education [11], have been widely recommended as a possible pedagogical tool for EMI science education [8,12,13] and have driven recent studies to examine how translanguaging was carried out by EMI teachers.

A strand of study is to explore EMI science lecturers' intentional or unintentional translanguaging practices and has found its diverse functions, such as asking higher-order questions (e.g., [14]), creating diverse classroom spaces to encourage teacher–student and student–student interactions [15,16], and constructing thematic patterns for science meaning-making (e.g., [17]). In contrast, the worry about using their home language may hinder their English-language development, and reluctant use of translanguaging out of language-policy and ideological reasons also exist [18]. Another strand of study focuses on translanguaging perception. This reveals that while some teachers acknowledged the value of translanguaging practice, some considered translanguaging as unusual and as something that should be avoided [19].

However, although many separate investigations on EMI teachers' translanguaging perceptions and practices have been done, little is known about to what extent one teacher's translanguaging perception gets translated into his or her classroom practices. There is even more insufficiency when it comes to EMI science university lecturers. As Kao and his colleagues [15] mentioned, "there is a call for a more careful analysis of the complexity of translanguaging as an instructional tool . . ." (pp. 86–87).

To address this gap, this study investigated the relationship between Chinese tertiary EMI lecturers' translanguaging perceptions and practices and the underlying reasons in three EMI engineering lecturers' classrooms. Our choice of the engineering subject was based on three considerations: (1) the language used to construct specialized discipline knowledge is also specialized, which means that potentially divergent language-related challenges exist among subjects [20]; (2) EMI courses in different subjects contain different practices and aims [21]; and (3) current research on lecturers' translanguaging perceptions and practices has mainly focused on humanities and art classrooms, leaving science and engineering subjects under-researched.

Previous case-by-case studies of teachers' translanguaging perceptions and practices outside of EMI contexts have revealed the complex interactions among the political, institutional, and ideological factors underlying the relationship between how teachers think about translanguaging and how they enact it in their classrooms and through which these studies have provided valuable suggestions on professional development (e.g., [22,23]). Therefore, it is hoped that by developing the understanding of how EMI lecturers view and enact translanguaging pedagogy and what factors may impede or facilitate the manifestation of their translanguaging perceptions in their practices, this study could generate suggestions for training EMI professionals to support the construction of a greater multilingual space for students' content knowledge and English-language learning.

Accordingly, three research questions were proposed:

1. How do the three EMI engineering lecturers perceive translanguaging pedagogies in their classrooms?
2. How do these lecturers use translanguaging practices in their classrooms?
3. Is there a difference between their translanguaging perceptions as reported in the interviews with the lecturers and the observed translanguaging practices?

2. Literature Review

2.1. Teachers' Perceptions of Translanguaging Pedagogy

Influenced by the long-held 'monolingual assumption', that is, the belief that maximum exposure to the target language is the optimal situation for language development [24] and a 'multilingual turn' in current educational contexts, teachers have mixed and some-

times contradictory perceptions about the use of other linguistic resources, for instance, students' L1, in EMI or English-as-second-language (ESL) or English-as-foreign-language (EFL) classrooms [25–28].

Macaro [28] identified three positions held by English teachers regarding using ESL/EFL students' L1: virtual position (the perspective favoring the exclusive use of L1), maximal position (the view recognizing the value of flexibly using students' L1 accompanied with the guilt of not using the target language), and optimal position (the belief that multilingual resources could be strategically employed for enhancing students' learning).

Although the participants of Macaro's [28] research were English-language teachers, this study still showed that EMI teachers who deliver their learning content in their students' second (L2) or foreign languages could have divergent perceptions about using their students' multilingual resources, such as their L1.

Among teachers in EMI classrooms, there is an increased acknowledgement of the pedagogical value of translanguaging practices. As an example, in Karabassova and San Isidro's [29] study, lecturers from a range of faculties at a Kazakhstan university regarded translanguaging as facilitating scaffolding to enhance their students' comprehension and as a temporary fix to help their students gradually adapt to the full target language context. These results are in line with Fang and Liu's [25] research that investigated the attitudes of tertiary-level Chinese EFL and EMI law lecturers toward translanguaging pedagogies. Most of the participants recognized the value of translanguaging practices, such as using students' L1 in class could help these students' comprehension, create class rapport and, more importantly, help students with inadequate English proficiency to obtain content knowledge.

However, multiple factors are still preventing EMI teachers from embracing the translanguaging stance, such as monolingual language policy (e.g., [25,30]), monolingual ideology (e.g., [22]), and the lack of implementation guidance [31]. Although research on teachers' perceptions of translanguaging has targeted institutionally and geographically diverse contexts, it should be noted that few studies have been devoted to content subject teachers in EMI settings [26]; in addition, science majors in higher education are a rarely discussed context in attitudinal studies on translanguaging practices [32].

2.2. Teachers' Translanguaging Practices in Class

Although teachers may have various and sometimes contradictory perceptions of translanguaging practices, translanguaging practice has been frequently observed in EMI classrooms (e.g., [33–35]). For instance, 95% of the EMI lecturers working in different subject areas surveyed by Chimirala [34] indicated that they also used languages other than English.

EMI teachers employed translanguaging out for diverse purposes, which mainly includes content transmission (e.g., [14,17,34,36]), classroom management (e.g., [33,36]), and students' social involvement in EMI classroom (e.g., [17]). Particularly in EMI science classrooms, the function of facilitating content transmission was stressed. Pun and Macaro [14] found that Hong Kong secondary school EMI science teachers switched to L1 when asking higher-order questions to help students break down complex concepts into simpler concepts and when challenging students to consider the relationships between component parts of one specific scientific concept. Similarly, Lin and Lo [17] observed that EMI physics teachers referred to students' local life experiences and used multiple resources (i.e., everyday L1/academic L1/academic L2) when explaining complex scientific concepts to students.

However, it is noteworthy that some EMI teachers were found to avoid the use of translanguaging and discourage students from applying their multilingual resources in class, which were due to the pressure from an institutional English-only policy (e.g., [22]), the discrepancy between their linguistic background and their students' (e.g., [22,37–39]), and teachers' lack of language awareness, which could be embodied in some EMI teachers' disagreement over viewing language instruction as their responsibility [40].

A review of these studies on translanguaging practices indicated different classroom language-use situations, in which some teachers employ students' multilingual resources

that could facilitate EMI teaching and learning in different manners, while some remain questionable to this approach because of school-, classroom-, and personal-level reasons. However, more reasons for such dichotomous translanguaging practices are awaiting exploration, especially from a perception perspective, as there has been an established understanding that teachers' actions are inextricably linked to their feelings [41]. Therefore, to facilitate a successful translanguaging practice implementation, more needs to be known about if or how lecturers' translanguaging perceptions play a mediating role when they decide to implement it or not.

2.3. Interaction between Teachers' Translanguaging Perceptions and Practices

A wealth of studies in the fields of foreign language education (e.g., [22,23]) and CLIL [29,42–44] have suggested a 'complex, nuanced, and sometimes contradictory' [45] (p. 38) interaction between teachers' translanguaging perceptions and how they enact translanguaging practices based on political, institutional, ideological, and contextual reasons [46].

Teachers with positive perceptions of translanguaging pedagogies may use limited translanguaging practices in naturalistic settings for political, social, ideological, and pedagogical reasons [22,43,47,48]. For instance, in a study of English-language lecturers at a Saudi university, Almayez [22] revealed that their self-reported use of few translanguaging practices in their classrooms was contrary to their perceived importance of using their students' native languages in classroom scenarios. Almayez [22] attributed this discrepancy to political (i.e., lecturers were deterred from going against the 'English-only' policy for fear of losing their jobs), contextual (i.e., they did not share the same L1 with students from various linguistic backgrounds), and ideological reasons (i.e., the monolingual fallacy that a purist immersion in English results in better English-learning outcomes). Another reason comes from the activity-specific concern that students would use translanguaging practices to obtain word-to-word translations while writing [47], which informs the need for teachers to grasp translanguaging pedagogical methods specific to different academic tasks, including reading and writing. This lack of professional support on how to implement translanguaging pedagogy was also noted by Lima Becker, Chang-Bacon, and Oliveira [48]; it disempowered the teachers from battling against either their monolingual ideology or the institution of power and consequently led to the wide gap between positive translanguaging perceptions and actual classroom practices. Furthermore, the fear that using students' L1 would slow down the acquisition of L2 also hindered some teachers' translanguaging practices, though they expressed a positive perception in the survey [43].

In contrast, some teachers who had a limited understanding of translanguaging pedagogies or attributed less importance to translanguaging practices actually frequently adopted translanguaging pedagogies in their teaching when considering students' comprehension needs [29,45,49]. For instance, in a Pakistani university, Khan, Nazir, TahirSaleem, and Khalid [49] found that EFL lecturers weighted EMI over translanguaging but used their students' L1 in secret in a compromise between the reality of their classrooms (i.e., the need to use students' L1 to facilitate better comprehension) and structural language policies (i.e., the English-only rule). Similar findings have also been found in the CLIL context [29].

Zúñiga [50] observed the orientations of lecturers in bilingual content as being related to their coexisting and complex language-as-problem and language-as-resource practices. On the one hand, these lecturers were active agents in valuing bilingual resources in their actual classroom practice (e.g., drawing on students' linguistic repertoires to navigate math problems in English) under a language-separate curriculum policy. On the other hand, their multilingualism ideologies and practices were strongly influenced by the pushback from high-stake target language standardized monolingual tests (e.g., the students used their L1 classes before taking state tests in English) and English's socially constructed significance (e.g., immediate transitions to English placements were considered beneficial for students with limited L1 proficiency). As Martínez, Hikida, and Durán [45] argued, the underlying reasons for the linguistic purism ideology paired with instances of translanguaging practices in the classroom were societal and institutional.

Taken together, the results of these studies suggest multi-layered reasons for the complicated and even contradictory relationship between teachers' translanguaging perceptions and practices. Therefore, we should be cautious about one-sided examinations of lecturers' translanguaging perceptions and practices [47,50,51]. By understanding how to facilitate the translation from positive translanguaging pedagogy to successful implementation and prevent the translation from lecturers' positive and/or negative translanguaging pedagogy to minimal translanguaging implementation, discussions of professional development support for lecturers to capitalize on the potential benefits of translanguaging practices could flourish [22,44]. Translanguaging pedagogies have been studied in the EMI research field over the past decade. However, few case-by-case studies have compared lecturers' translanguaging perceptions and practices [21,52]. Alhasnawi [21] found a match between translanguaging perceptions and practices among four Iraqi EMI math lecturers who perceived translanguaging positively and used translingual and multimodal resources in their teaching. In an international branch campus in Qatar, Hillman, Graham, and Eslami [52] conversely observed a contrast between lecturers' beliefs in the exclusive use of English to benefit students' content learning, but also observed translanguaging practices using rapport building, knowledge scaffolding, inclusive classroom environments, and group work. The results of these studies suggest that the relationship between lecturers' translanguaging perceptions and practices is rather complex and uncertain.

3. Theoretical Framework

This understanding of translanguaging and translanguaging pedagogies underpins our examination of the research context, the design and implementation of our research method, and data interpretation.

The term, 'translanguaging', was initially used in 1994 by the Welsh scholar Cen Williams, who defined translanguaging as 'the planned and systematic use of two languages inside the same lesson' [53] (p. 288) and believed that capitalizing on learners' L1 could benefit L2 learning.

The notion of translanguaging consists of (1) a practice through which bi/multilinguals engage in and make sense of the world by dynamically using different languages and language varieties and (2) a process of knowledge construction with semio-linguistic repertoires in different contexts [11,54]. As a pedagogy, it proposes collectively drawing on students' language backgrounds and their vast linguistic and semiotic repertoires to improve their content-knowledge construction and target-language learning [55]. In our analysis, we followed these cardinal understandings and explored lecturers' translanguaging perceptions and practices with a primary focus on how lecturers' and their students' linguistic repertoires were capitalized on in the meaning-making process, in addition to a secondary focus on semiotic repertoires for meaning making, knowledge construction, and language learning, among other pedagogical functions.

Although the idea of repertoires in a translanguaging lens dismantles the artificial boundaries between languages in bi/multilinguals' natural sense-making processes, scholars have pointed out the importance of recognizing that bi/multilinguals are equipped with a system of languages with both shared and discrete grammatical resources across languages [56]. As MacSwan [56] noted, a repertoire includes:

"richly diverse internalised mental grammars as well as the diverse vocabulary and systems of knowledge pertaining to discourse, pragmatics, and other social conventions that we recruit in verbal interactions with others" (p. 189).

Therefore, the current research was guided by this integrated multilingual perspective, which embraces individual bilingualism as psychologically real and universal [57] and posits the existence of internal language-particular (e.g., Chinese and English) differentiation cognitively realized by language users [54,58], although there are no clear-cut psycholinguistically conceptualized boundaries between languages [59,60]. This view helps this research to label lecturers' and students' linguistic resources (i.e., L1 and L2) so as to ob-

serve how changes in lecturers' and students' language systems reflect their comprehending and producing processes [57].

4. Methodology

This study used a qualitative method with a multi-case study design [61] to identify EMI lecturers' translanguaging beliefs and the ways in which these beliefs were translated into classroom practice. The findings present detailed descriptions for each case. In addition, Section 6 includes a cross-case analysis [62]. Although case studies are sometimes criticized because of their lack of generalizability, insights from case-study findings are still suggested to be directly influential for policymaking and future research studies [63].

We present the case studies of three lecturers who were selected because of their one, two, and three semesters of EMI teaching experience. To facilitate the triangulation process in conducting this multi-case study, the data collected included (1) semi-structured interviews with an adapted translanguaging protocol, (2) teaching videos, (3) slide analyses (however, the slides cannot be presented because of confidentiality issues), and (4) the researchers' classroom observation notes. To avoid the potential influence of the interviews—that is, the lecturers might deliberately heed the use of translanguaging pedagogies in their teaching practices, which could differ from their previous routine teaching practices—the interviews were conducted three weeks after the completion of the EMI course.

4.1. Context and Participants

The research site was a university in a western province of China, a region where EMI course development faces more difficulties than in the more economically developed areas of eastern China [64]. Demographic information of the participants can be seen in Table 1. The participants were three EMI from the Mechanical and Engineering College at this university. Out of consideration of protecting privacy, participants were anonymized. One of the participants was female, and two were male. Each had a doctoral degree with two to five overseas study and research experiences in an English-medium instruction environment, including in France, the USA, and Canada. The EMI course of this college had been running for three years and was compulsory for all first-year graduate engineering students, with no threshold minimum of standardized English test scores. The course was run as a two-week session (four consecutive days per week) each semester, comprising four classes with around 30 students per class (the class schedule is provided in Table 2).

Table 1. Profile of participants ($n = 3$).

Name (Pseudonym)	Gender	Subdiscipline Topic	Academic Title	EMI Teaching Experience (Semesters)	Overseas Study Experience (Years)
Mei	Female	Flexible electronics manufacture	Assistant professor	1	3
Liang	Male	Micro- and nano-optoelectronic devices	Lecturer	2	2
Feng	Male	Precision machining	Associate professor	3	5

Table 2. EMI course schedule.

Class No.	Day 1	Day 2	Day 3	Day 4
Class 1				
Class 2	Feng: precision machining	The lecturer did not participate in this study.	Mei: flexible electronics manufacture	Liang: micro- and nano-optoelectronic devices
Class 3				
Class 4				
	Day 5	Day 6	Day 7	Day 8
Class 1				
Class 2	Feng: precision machining	The lecturer did not participant in this study.	Mei: flexible electronics manufacture	Liang: micro- and nano-optoelectronic devices
Class 3				
Class 4				

4.2. Data Collection

4.2.1. Classroom Observations

To explore the lecturers' translanguaging practices, we first entered each of their classrooms to observe their translanguaging practices. We collected both audio and video recordings of their teaching practices with their consent. As observers, the two researchers recorded a total of 510 min of the three participants' teaching practices without involving themselves in classroom interactions. The researchers were posited as outsiders to minimize their potential influence on the lecturers' language use in a natural setting [65].

In addition, teaching slides were collected as a supplementary resource to understand the lecturers' translanguaging practices. Episodes of classroom discourse related to their translanguaging practices (e.g., the lecturers switched between L1 and L2 in their verbal and written communication in addition to using figures and graphs) and in which the students' responses to their translanguaging practices, if any, were teased out and transcribed.

4.2.2. Semi-Structured Interviews

To understand the participants' translanguaging perceptions, we collected data from think-aloud semi-structured interviews using an adaptation of the Classroom Approaches to CLIL and Translanguaging Inventory (CACTI) as guiding questions. The CACTI is a well-validated survey proposed by Mendoza and Ou [66] for primary and secondary teachers in EMI or CLIL contexts that explores nuanced translanguaging practices in different classroom tasks (e.g., reading, writing, discussion of complex sentences, and creation of multilingual environments). It may be challenging for teachers to talk about how they might use translanguaging pedagogies in their classrooms; therefore, researchers may miss valuable data and only obtain partial results. Hence, the questionnaire items make the abstract translanguaging ideas more concrete and may elicit more narratives from the participants pertaining to translanguaging in practice.

Changes were made to the original questionnaire items to suit the university context and engineering-specific language needs and tasks. The original English questions and instructions were translated into Chinese so that they could be understood by the participants. We conducted a pilot study in which two engineering doctoral researchers were interviewed to improve the validity and credibility of the adapted interview protocol [67]. Following the pilot study, we made several changes to the interview protocol. For instance, the participants in the pilot study reported that some of the linguistics terms were mysterious, such as 'multilingual ecosystem', 'unequal status of language', and 'bilingual teaching strategies'. In response, we prepared explanations of these terms with examples for use during the interviews. Appendix A presents some example items (in English) from the final revised inventory based on the lessons learnt from the pilot study.

All three 50-min interviews were conducted online with each of the three participants because of the COVID-19 pandemic. All interviews were conducted in Chinese and video- and audio-recorded.

The interviewer first introduced EMI contexts and translanguaging. The interviewees' responses, such as 'Yes, your study from the language teaching perspective is precious for us' and nodding, could inform a successful practice of helping participants build a shared and appropriate understanding of the purpose of the interview [68]. Some communication strategies were used to create a safe and relaxed environment for participants; for example, the interviewer started the interview by saying, 'I'm interested in hearing your thoughts on translanguaging to help us develop this relatively new territory in the Chinese context and to support more students and educators'. In language-related interviews with EMI lecturers, these efforts toward a balanced power relationship between interviewer and interviewee are especially crucial because the participants may assume inferior positions because of their perceived lack of English-language proficiency and knowledge of second-language education.

The interviewer then presented questionnaire items and asked the interviewees to give their opinions on each item and the reasons for their ratings. Scheduled and unscheduled follow-up questions (e.g., 'Please elaborate on why you think it is less important to your EMI classroom?') were used to prompt the interviewees for more detailed and complete narratives [69].

4.3. Data Analysis

In the data transcription process, the classroom observation (frame-by-frame translanguaging-related episodes) and interview data were first translated into English following a three-step translation procedure [70] to improve the data validity and credibility.

The translanguaging-related episodes were coded inductively with three questions in mind. In what classroom scenarios did the lecturers use translanguaging pedagogies? What was the purpose of the lecturers' translanguaging pedagogies? How did the lecturers use translanguaging pedagogies? Once we identified the translanguaging scenarios, functions, and approaches, we watched these video segments again with particular attention to the lecturers' use of multimodalities (e.g., graphs and images).

We processed the interview data inductively using NVivo 12 qualitative data analysis software. As with most qualitative research, inductive methods were used in the data analysis to investigate the responses to the open-ended research questions [71].

We performed structural coding to identify themes based on tasks (T), attitudes (A), and reasons (R). Structural coding helps researchers to apply codes or categories that can serve as preliminary categories for further coding. Based on the structural coding results, we used evaluation coding to mark the participants' attitudes (A) toward translanguaging (with '+' representing positive, '-' representing negative, and '~' representing an obscure comment). Specifically, '+' refers to translanguaging speech, which reflects the lecturer's awareness of capitalizing on the students' and their own linguistic and semiotic resources and their supportive functions in meaning making, interactive knowledge construction, language learning, and building comfortable environments. The '-' refers to the translanguaging speech that reflects the worry, fear, or repudiation from using students' and lecturers' linguistic and semiotic resources. Finally, '~' refers to translanguaging speech that reflects the reluctant or limited use of the lecturers' and/or students' linguistic and semiotic resources. To ensure coding reliability, each of the two researchers first coded independently and then evaluated the fitness and reasonableness of the categories by comparing and combining the codes [72].

5. Findings

5.1. Mei: Two-Pronged Translanguaging Perceptions versus Predominant Use of Chinese in Practice

It was the first time Mei had taught an EMI engineering course. Her interview showed both positive and negative perspectives of translanguaging pedagogies, depending on dif-

ferent classroom tasks and students' English proficiency levels (i.e., interactional), perceived EMI goals (i.e., personal), and the socially constructed value of full EMI (i.e., socio-cultural). This complex perspective was only partly reflected in her teaching practice, in which she used Chinese extensively while switching to English occasionally. This translanguaging practice–perception gap can be explained by Mei's minimal EMI teaching experience, self-perceived insufficient English ability and management of disciplinary English, her unfamiliarity with the subdiscipline content knowledge she was assigned to teach (i.e., personal), and the realistic needs of her students in the classroom who showed difficulties in understanding and self-expression (i.e., interactional).

As shown in Table 3, Mei's positive perception of translanguaging practices was demonstrated through her recognition of the value and realistic need to use students' L1 resources to ensure that they understood the complex terms and concepts being discussed in engineering lessons [73]. For instance, when thinking aloud about whether 'the lecturer explains terms in both English and Chinese' was important in her classroom, she said that 'some disciplinary stuff is easier to understand in Chinese'.

Table 3. Examples of Mei's translanguaging perception and practice.

EMI goals:			
1. To improve students' disciplinary-specific English ability;			
2. To improve their awareness and urgency to learn disciplinary-specific English well, especially for those who plan to study abroad;			
3. To support students' content knowledge learning.			
Translanguaging Perception	Interview Examples	Classroom Episode	Classroom Practices
Using L1 for maximizing students' content comprehension	'Some disciplinary stuff is easier to understand in Chinese.'	M-1 (Class 1— 1'46"—3'47")	The predominant use of Chinese for content introduction, concept explanation, and fabrication process.
	'I would encourage them to use English. But they can use some Chinese when they cannot express themselves.'		
+		M-3 (Class 2— 5'52"—8'29")	Switching to Chinese to continue the instruction when encountering difficulties in expressing in English.
			'And compared with the uh battery, the supercapacitor pa uh poses some advantages such as uh high power and the first charging time and more uh operating safety 就是我这一页是做了一个电池和创意电容器的一个对比。作为就是这目前来说比较常用的两类储能器件... [It is... I made a comparison of batteries and creative capacitors on this page. As is the more commonly used two types of energy storage devices...] (All in Chinese).'
Employing multiple linguistic and semiotic resources (schematic diagrams, arrows, different colors, and tables) for meaning making.	'Pictures, videos, and supporting methods help students to understand better and they would like to look at them compared with word-dense slides.'	M-2 (Class 1— 12'53")	Employing multiple linguistic and semiotic resources (schematic diagrams, arrows, different colors, and tables) for meaning-making
Attaching more importance to understanding content knowledge than discussing the language used to construct knowledge.	'It is more important to identify important message from a sentence, like a term used in research method, than discussing its sentence structure.'		N/A

+ positive translanguaging perceptions, – negative translanguaging perceptions.

In another question about the importance of having students discuss writing tasks (e.g., experiment-report writing) in a translanguaging manner, she commented:

"I would encourage them to use English. But when they cannot express themselves, it is important for them to combine the Chinese to help explain."

These statements show that Mei viewed translanguaging pedagogies as a ‘functionally integrated manner’ [74] (p. 641) to mediate and facilitate her students’ cognitive processes in understanding and learning content knowledge.

In her teaching practice, however, this asset-based perception of her students’ linguistic resources turned into a predominant use of Chinese. She explained ‘some disciplinary stuff’ with minimal switches to English (as can be seen in Episode M-1). English-language elements were only seen in slides. This lack of translanguaging pedagogies could be partly explained by her lack of EMI teaching experience, short preparation time, and unfamiliarity with discipline-specific English. As she reflected:

“After all, English is not our native language, so sometimes it feels like it will degrade after not speaking for a long time . . . This class was really the first class of my life. The preparation time is also very short . . . Then the other aspect is that my English needs some improvement.”

Another potential reason for Mei’s predominant use of Chinese is the difficult linguistic nature of English vocabulary in the subject of engineering, which may have deterred her from speaking in English and could add more teaching pressure:

“Because some chemical terms are very professional and lengthy, like thermosensitive electrolytes. It’s better to say it in Chinese because it’s too long, and sometimes I can’t even understand the English version. So I think it’s better for me to say it in Chinese.”

Another positive translanguaging perception from her statement is the importance of using pictures, graphs, and videos to support students’ meaning-making: ‘Pictures, videos, and supporting methods help students to understand better and they would like to look at them compared with word-dense slides’. As another holistic view of language, multimodality (e.g., using symbols and visual images) is part and parcel of meaning making and communicating knowledge for science students [75]. Mei characterized this semiotic resource as being valuable because engineering students may be more familiar with multimodalities to support comprehension and interpret discipline knowledge; therefore, it can be seen as a positive perception of translanguaging pedagogies. This perception was found to be frequently embedded in Mei’s classroom practice: for instance, she used a laser pointer to indicate the picture demonstrating a thermal self-protection function while simultaneously introducing this new concept to her students.

In contrast, Mei also demonstrated some negative translanguaging perceptions. For example, she considered that using English was better than Chinese and that her students’ L1 resources were not helpful or necessary in the language-related discussions in her EMI classroom. One indication of this negative perspective was her comments about ‘whether it is important to build a multilingual system in the class’. She said:

“Although it is possible to switch between English and Chinese, it would make me look more professional if I could use English all the time. If follow-up classes need to be in this combination of English and Chinese, Chinese must be less.”

In Mei’s case, the presumed English-only EMI language policy had less influence on her choice of language than her perception of the value of English endowed by the strong monolingual ideologies in the language teaching field and academic literacy in China [73].

In practice, however, her preference for more English use was quenched, as mentioned above. Moreover, she tended to switch from English to Chinese and then to keep explaining in Chinese, especially when discussing a slide loaded with English sentences and terms. As in the example shown in Episode M-3, she first tried to explain the table in English (the teaching slide cannot be presented for confidentiality reasons). After listing the English terms on the slide and approaching a complex sentence, ‘Intercalation/de-intercalation of cation . . . materials’, she switched to Chinese to explain the sentence, which she also supplemented with more explanatory information not included on the slide. Although this pedagogical practice could not be explained by her wish to use more English to be viewed as being ‘more professional’, this switch to Chinese to explain the content of the

slide helped to alleviate her pressure to speak English and may imply that she put more weight on content learning.

For this novice EMI lecturer, the multidimensional contradictions of her translanguaging perceptions and practices occurred during her negotiation of personal, interactional, and socio-cultural factors. Behind this perception of inconsistency and her predominant use of Chinese were her obscure EMI objectives and her role as an EMI lecturer wavering between content-knowledge learning and discipline-specific English learning, as well as her lack of confidence in EMI teaching and inadequate discipline- and instruction-specific English ability, suggesting the urgency of EMI teaching training support for novice EMI lecturers.

5.2. Liang: Negative Translanguaging Perceptions versus Predominant Use of English in Practice

Teachers arguably commonly hold tentative beliefs about their pedagogical stance [76]. Similar to Mei, Liang disclosed his fluctuating translanguaging pedagogies with a mixture of negative and obscure perceptions. The rationale for his negative perceptions could involve his perception of his students as being capable self-learners (i.e., interactional), in addition to his EMI goals, EMI lecturer role, and personal overseas study experience, which made him unaware of the unique features of academic English during teaching (i.e., personal) and how L2 can be learnt (i.e., socio-cultural).

Liang's obscure attitude toward translanguaging pedagogies was reflected in his opinion that he used his students' L1 resources reluctantly. When he commented on the importance of explaining technical terms in a combination of English and Chinese in his classroom, he said:

"When they [the students] don't have a basic understanding [of English], then Chinese is needed."

He considered the use of his students' linguistic resources as being a second choice (using English is the first choice) for the sake of their necessary comprehension. Moreover, he confessed his concern that 'if I allow them to freely choose to use a language, they will all use Chinese' when thinking aloud about 'whether it is important to explicitly encourage students to integrate Chinese and English in their own ways'. Although his concern was seemingly consonant with his instructional objective (i.e., to communicate in English during engineering-related social and academic activities), this perception could be related to his belief that the exclusive use of L2 was a silver bullet to enhance his students' language learning.

He also demonstrated his negative perception of translanguaging pedagogies as being unnecessary for graduate students in his EMI course. For instance, he dismissed the use of translanguaging pedagogies to discuss complex sentence structures: 'academic information is already presented in English, so there is no need to discuss the differences in Chinese and English academic language'. Liang considered English input as ideal for enhancing his students' disciplinary abilities such that translating back into Chinese was futile. He also argued that creating a multilingual classroom ecology was less important when key academic terms and expressions could be provided using various linguistic and semiotic resources [77]. His rationale was that 'they are graduate students; they should know what words they don't understand and then use the translator software on their own'. This rationale shows his belief in his graduate students' self-awareness in language learning and his perception of his role as an EMI lecturer to teach engineering content instead of English vocabulary.

Notably, Liang's mixed perception of translanguaging pedagogies was strongly oriented toward using English in his classroom. Despite valuing the importance of inviting his students to engage in critical thinking during discussions of concepts presented in a journal article, he did not mention using translanguaging pedagogies during these activities. These translanguaging pedagogies could be used to bridge gaps in his students' knowledge, facilitate their interactions, and motivate them to complete tasks focused on content learning [78]. He also talked about the need for his students to translate experimental methods, results, and mechanical features from Chinese to English, in contrast to the unnecessary translation from English to Chinese.

These perceptions were illustrated in Liang’s classroom practice where he mainly used English with a few terms explained or translated into Chinese. On the contrary, he widely used Chinese to manage his classroom. During the 100-min classroom observation recording (including 950 s student talking time), he spoke for 195 s in Chinese. For instance (Table 4), Liang switched to Chinese to explain the abbreviation ‘DI’ (Episode L-1). Similar instances of translating discipline-specific abbreviations into Chinese without using full-name introductions were also observed during other class moments (e.g., ‘PL is 荧光光谱或者光致发光谱’ (fluorescence spectrum)). Another trace appearance of translanguaging pedagogies was observed in his classroom management (e.g., Episode L-2), which could be explained by Liang’s EMI goals, which focused on using discipline-specific English rather than everyday English [72], according to his belief that more target-language input would result in better target-language learning.

Table 4. Examples of Liang’s translanguaging perceptions and practices.

EMI goals:			
1. NOT to be able to understand difficult content knowledge;			
2. To successfully participate in discipline-related social and academic communities where English is widely used for communication;			
3. To actively ask questions and respond in English in class.			
Translanguaging Perception	Interview Examples	Classroom Episode	Classroom Practice
~ Using students’ L1 reluctantly for their need to comprehend lecturers’ instructions	‘When they [the students] don’t have a basic understanding [of English], then Chinese is needed.’	L-1 (Class 1— 10’31”–10’49”)	‘Take out, washed by the DI water, DI water in Chinese is 去离子水, 或者是叫超纯水, [deionized water, or ultrapure water] water. And we dry, dry the sample by natural, natural gas flow.’
– Viewing students’ language knowledge as separate entities	‘academic information is already presented in English, so there is no need to discuss the differences in Chinese and English academic language.’	L-2 (Class 1— 51’44”–52’05”)	‘... for the purposes of photo response properties. 行, 那本节课我们就先结束那个下一节, 我们就下面这几个问题, 我们那个进行一下讨论 [Okay, that’s the end of our discussion. Next class, we will discuss these following questions.]’

– negative translanguaging perceptions.

Taken together, Liang’s translanguaging perceptions are largely in tune with his classroom practice according to personal, interactional, and socio-cultural reasons. Liang also observed that the main challenge in his teaching was that ‘students cannot understand what I am talking about’. He managed the tension between supporting his students’ understanding and enhancing their discipline-specific English-language ability. From his perspective, this tension evolved into a pendulum swinging between using Chinese and English. He swung in favor of using English.

5.3. Feng: Translanguaging Pedagogies for Effectively Transferring Content Knowledge versus the Flexible Use of All Language Resources

After 5 years of learning experience in an English-speaking country, Feng has been teaching EMI engineering courses at his current university for 3 years. As reflected in his interview, he perceived the integration of multilingual resources for meaning making in EMI classrooms positively according to his belief that translanguaging practices could enhance the transfer of content knowledge to his students. Our classroom observation found that Feng actively resorted to using multiple language resources in different approaches, such as switching to Chinese to present an overview of the following English instruction and paraphrasing his English instruction in Chinese. This consistency between Feng’s translanguaging stance and practices could be explained by his content-based objectives in his EMI classroom and his multilingual awareness (i.e., personal), his students’ difficulties in understanding full EMI (i.e., interactional), and his difficulty realizing full EMI in his classrooms during his previous teaching practice (i.e., socio-cultural).

Table 5 briefly summarizes Feng’s translanguaging perceptions and practices. As Feng’s main objective was to help his students understand the lessons and then construct

knowledge as much as possible, he advocated for using all approaches that could benefit his students’ comprehension of content knowledge. From his perspective, his students’ L1 has intrinsic advantages in enhancing their understanding of his instructions compared with their L2 or foreign languages. Therefore, he would inevitably use his students’ L1 when he perceived that his students had difficulty understanding his English instruction. In the interview (Example 1), he mentioned that his teaching experience during his previous full EMI classrooms reminded him that his students, especially those with lower English proficiency, could not fully understand his English instruction.

Table 5. Examples of Feng’s translanguaging perceptions and practices.

EMI goals: 1. To enhance students’ interests in the discipline; 2. To expand their content knowledge; 3. To improve their academic English communicative ability.			
Translanguaging Perceptions	Interview Examples	Classroom Episode	Translanguaging Practices (Linguistic Resources)
+ Using L1 for maximizing students’ content comprehension	Example 1. Students’ English proficiency varies a lot in the same program. We have explored EMI instruction for several years. We found that asking students to communicate with each other in English was quite challenging. In the full-EMI classroom, we tried to create in the beginning, but students could not understand our questions, which badly influenced communication.	F-1 (Class 2—13’12”–13’39”)	Giving an overview in Chinese before English illustration
		F-2 (Class 1—03’57”–06’16”)	Explaining scientific concepts in Chinese when students did not have responses to previous English questions
+ Employing multiple languages together for meaning-making	Example 2. I did not deliberately ask students to understand concepts by using English. Our purpose is to let students what they are, whatever by using Chinese or English. Example 3. I think when learning new concepts in physics or chemistry, students definitely construct ideas in Chinese, because Chinese is always in their mind and it lets them figure out those concepts more quickly. And when students try to express ideas in different languages, like English and Chinese, they need to respect the ways different languages describe the concepts and say it differently.	F-3 (Class 1—26’20”–28’01”)	Paraphrasing English instruction in Chinese by adding extra information and explaining in a less formal manner

+ positive translanguaging perceptions.

Feng saw his students’ L1 as being valuable in making content knowledge more accessible. In the observed lesson, Feng often resorted to Chinese to complement his English instruction. Feng often used Chinese to present an overview of the following English instruction, as seen in Episode F-1, or switched to Chinese when he recognized his students’ disengagement (e.g., lack of response to his questions), as seen in Episode F-2.

From the interview (Example 2), it could be inferred that Feng disagreed that sticking to an English-only policy applied to his current EMI engineering classroom and he included multilingual resources if they could help his students understand the learning content, indicating his multilingual awareness.

Feng also believed that translanguaging practices occurred naturally when his students acquired new knowledge, especially cognitively demanding concepts. His students constructed their knowledge using their L1, which could then be translated into different languages to meet their varied communication needs (Example 3).

Feng mixed academic English and Chinese languages and everyday Chinese language in his teaching practices to bridge his students' multiple linguistic resources when explaining complex concepts [79]. In Episode F-3, for example, Feng first introduced three concepts, 'remove', 'combination', and 'deformation', by providing their definitions in English. He then switched to Chinese for a more detailed explanation of these three concepts by giving examples of each concept and trying to correlate them with his students' academic and daily life. For instance, in Chinese, Feng gave examples for each concept (e.g., '减材制造就是像传统的机械加工 (One of the examples for subtractive manufacturing is traditional machining') and tried to correlate it with students' academic and daily life (e.g., '像我们学院也有很多老师和同学在做这个 3D 打印的这种研究 (Many teachers and students in our department are doing research on 3D printing)').

In conclusion, Feng held a favorable perception of translanguaging pedagogies in content-based EMI classrooms because they could be used to enhance his students' content knowledge comprehension, which was his main objective. In line with his positive translanguaging stance, he actively mobilized multiple resources in his EMI lessons, such as academic English and Chinese languages and everyday Chinese language.

6. Discussions and Implications

The relationship between lecturers' translanguaging perceptions and practices is increasingly being investigated to obtain a better understanding of in-class language use and language perceptions of learning content and language teachers in settings in which more than one language can be used to communicate [13,22,47]. In the current study, we built on these practice and perception studies and the understanding of translanguaging pedagogies to present the cases of three EMI lecturers with different lengths of EMI teaching experiences. These three cases reveal the intricate, concurrent, and even contradictory transitions from translanguaging perceptions to teaching practices, which are influenced by socio-cultural, personal, and interactional factors (Figure 1).

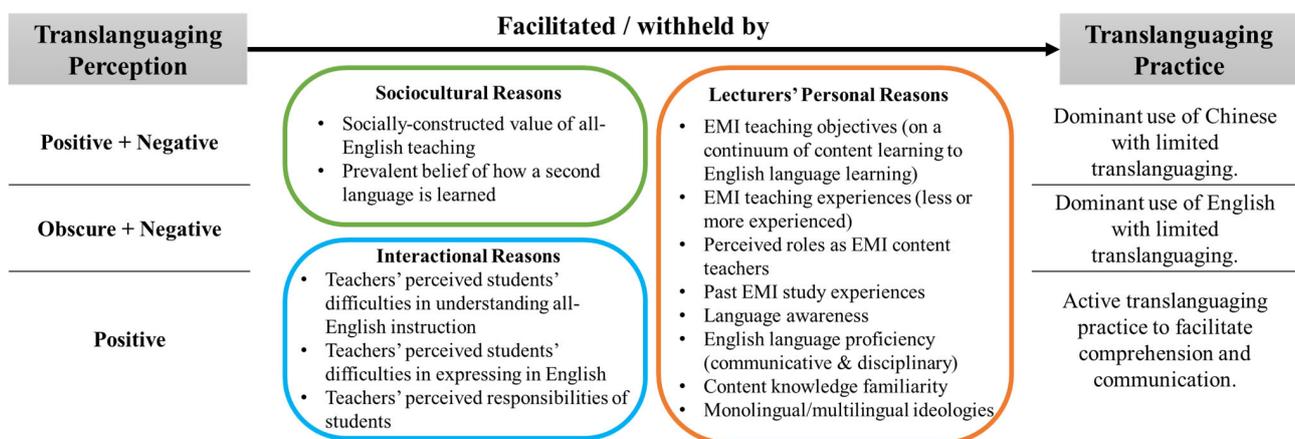


Figure 1. The three-factor mediation model of EMI lecturers' translanguaging perceptions and practices.

As shown in this three-factor mediation model of EMI lecturers' translanguaging perceptions and practices, lecturers' personal reasons include factors germane to their individual experiences, capabilities, and opinions, such as their perceived EMI teaching

goals, perceived roles as EMI lecturers, past EMI learning experiences, language awareness in classroom tasks, perceived English-language proficiency, and their knowledge of content teaching areas. We also view multi- and monolingual ideologies as a factor in the personal domains, which denotes the extent that standard English and English-only classroom language practice are idealized, and inscribe the influence of social power [75]. Similarly, previous research has also highlighted this robust ideological monolingualism in lecturers' translanguaging perceptions and practices [43].

Interactional reasons relate to lecturer–student interactions, which include students' difficulties in understanding and expressing themselves in a full EMI environment and their responsibilities as graduate students with a certain degree of independent learning abilities. Unlike studies that have attributed lecturers' switch to L1 to their perception of their students' limited L1 proficiency and the multilingual reality [50,80], the findings of this study argue for multiple factors including lecturers' personal and socio-cultural experiences that influence their translanguaging perceptions and practices, and are not limited to students' language proficiency.

Socio-cultural reasons consider the intersection of language and social power structures [81], in addition to the intersection of language learning and the socio-cultural context of China (e.g., an examination-oriented learning culture, the lack of attention to practicing oral English, the advocacy of accepting the beliefs associated with English language and culture, and the belief that the optimal English learning is immersing in a "standard" English environment) [82]. The factors included under this domain are the socially constructed values of full EMI and the prevalent belief that an L2 can be learnt through 'the more, the better' target-language input [83] and bilingual vocabulary translations [84]. This normative set of values can either influence or reinforce the lecturer's monolingual beliefs (see Liang's case) or become a source of guilt when EMI classroom reality (e.g., students' indigestion of content knowledge instructed in English) and personal reasons (e.g., English-language proficiency) make them realize the impossibility of enacting full EMI (see Mei's case).

Nevertheless, in contrast to other studies pointing out the powerful institution-level influence of 'English-only' EMI teaching policies (e.g., [22,49]), all of the lecturers in this study seemed less restricted by a full EMI policy. Instead, their negotiation of translanguaging perceptions and practices was performed through a combination of personal (e.g., limited English-language skills), ideological (e.g., the belief that a language can be learnt through abundant input), and interactional reasons (e.g., students' comprehension difficulties). These three factors either obstructed (see Mei and Liang) or facilitated (see Liang and Feng) the transition from positive, obscure, or negative translanguaging perceptions to teaching practices.

First, dominant use of Chinese may not be due to lecturers' negative perceptions of translanguaging. In Mei's case, her personal factors (e.g., minimal EMI teaching experience, insufficient communication and English skills in the engineering discipline, and unfamiliarity with content knowledge) impeded the implementation of her positive translanguaging perceptions (Figure 2). Despite the literature suggesting that EMI training should be provided to support lecturers' English-language abilities, especially in terms of their communication skills in the classroom [85], Mei's story suggests particular attention to EMI lecturers' English proficiency in their discipline and content-knowledge familiarity. Although this finding seems to stand in contrast to the study by Dimova and Kling [86], in which they claimed that EMI lecturers should have strong expertise in their discipline- and domain-specific vocabulary, our finding may be due to the difference in contexts (i.e., Chinese and European EMI settings) and Mei's lack of EMI teaching experience. In addition, a critical factor could be the assigned teaching content, which is an engineering sub-domain. Therefore, lecturers must put more effort into absorbing specialized content knowledge (SCK) [87]. Hence, it is vital to provide appropriate general and discipline-specific English language, in addition to content-based support to new EMI lecturers. More time should be given to lecturers to prepare their lessons so that they can become familiar with the content and English vocabulary required to deliver content knowledge to their students in EMI.

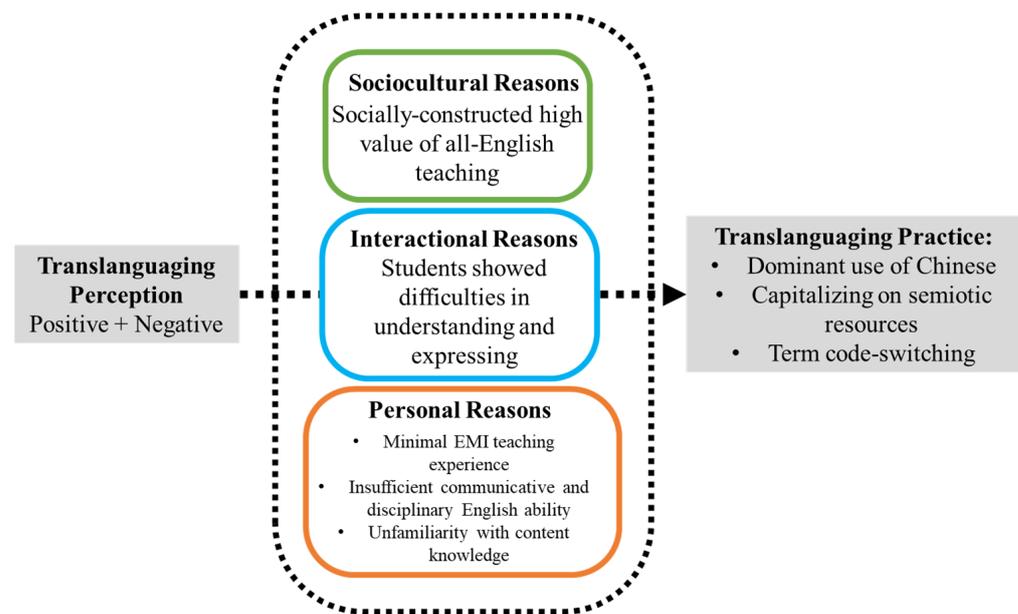


Figure 2. The three-factor mediation model used in Mei's case study.

Conversely, lectures' minimal translanguaging practices and relatively monolingual EMI teaching practices can also be related to their obscure or negative perception of translanguaging under sociocultural (e.g., the socially constructed belief of English being learned through input and bilingual translation), interactional (e.g., perceived graduate students' roles as capable self-learners), and personal reasons (e.g., perceived role as a content teacher) that give meaning to their practice. As shown in Figure 3, Liang's paralleled negative translanguaging perceptions and practices may result from his negotiation between teaching learning content and the English language with his perceived role as a content lecturer. As Richard and Pun [5] pointed out: 'EMI teachers do not normally see their roles as auxiliary English teachers, since the students' English is assumed to be the responsibility of the English-subject teachers' (p. 228). Another socio-cultural reason is the long-held belief that maximum exposure to the target language is the optimal situation for language development [24]. He assumed that his students would choose to use more Chinese if he allowed them, which might be indoctrinated by the prevalent idea that English was best learnt merely through more input. This belief was challenged by Vygotsky's cognitive and socio-cultural theory (CST) and Cummins' linguistic interdependence hypothesis. In CST, knowledge scaffolding is the key factor for learners to achieve the next level in their zone of proximal development. Learners' non-target language resources, such as their L1, could therefore be used to scaffold ideas and stimulate their cognition and interactions in the development of their target-language knowledge [88]. Cummins [58,89] argued that bi- and multilingual speakers have a 'common underlying proficiency' [89], and their knowledge of the world, as well as their academic and thinking skills, could be transferred across languages. Thus, students' literacy development in one language could help, rather than hinder, their learning in other languages.

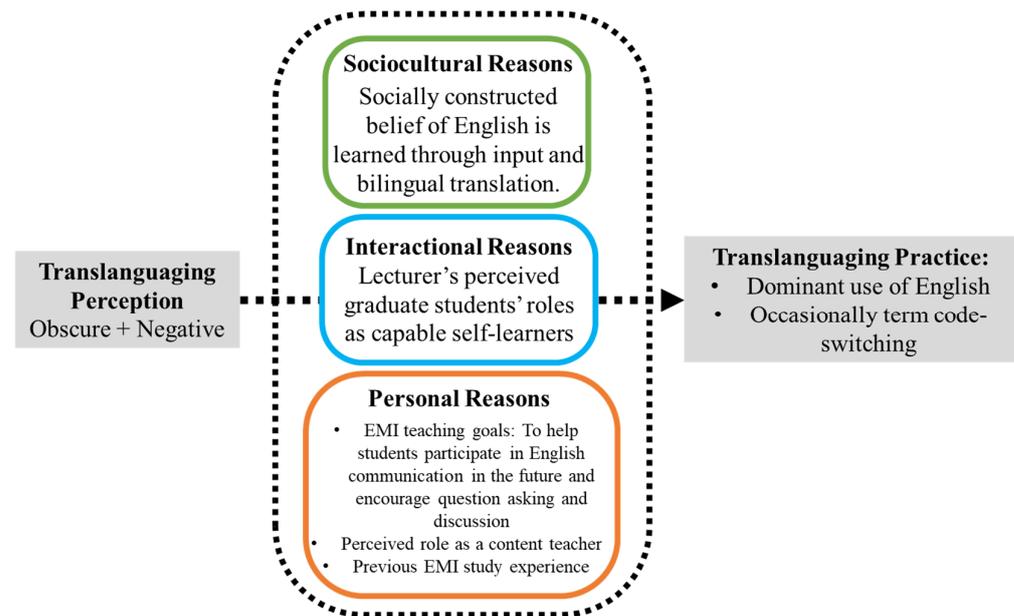


Figure 3. The three-factor mediation model used in Liang's case study.

However, to some extent, this dominant social value toward English in China made Liang think that the dominant English usage practice was meaningful and beneficial to students. Although, in this case, his perception was congruent with his practice; this was the negative perception of translanguaging and relatively monolingual classroom practice that was reinforced by socio-cultural factors. The monolingual practice has been widely observed in Chinese EMI classrooms, in which most lecturers use English for the majority of their teaching time and use their students' L1 only when their comprehension is lacking [90]. As many researchers have emphasized the negative effect of teachers' monolingual belief on students' academic achievement [91], this case can inform that, as key initiators in bringing about a more inclusive and multilingual vibe in EMI classrooms, lecturers' original and deeply rooted monolingual ideologies can be difficult to alter. Thus, professional training efforts to encourage EMI lecturers' "uncomfortable" reflection on what socio-cultural reasons influence their language ideology in EMI, what social and academic roles they think English takes and why, and if their language ideology can really support their language-related teaching objectives in EMI classrooms are needed. As thus, practical changes to a more fluid and open language environment that benefits students' academic performances can be achieved in EMI classrooms. Moreover, EMI content lecturers, especially those whose EMI teaching goals involve both content and language learning and whose students do not have much English proficiency, require an enhanced understanding of the value of their students' linguistic repertoires. Therefore, training programs could introduce EMI lecturers to subject-specific examples of translanguaging (e.g., the function of languages in the scientific epistemic practices of choosing evidence, analyzing data, and designing solutions) and operable strategies (e.g., inviting students to share their linguistic identities) [92]. Meanwhile, an active use of translanguaging in class does not mean a positive perception toward translanguaging. Mei's socially constructed monolingual perspective of language was one of the key reasons hindering her confident use of her students' linguistic resources (Figure 2). Similarly, previous research has also highlighted this ideological effect on lecturers' translanguaging perceptions [52]. The prevailing monolingual ideology in EMI classrooms could lead to lecturers' sense of guilt or failure when using languages other than English [26,93] because of their perception that using non-target language is a lazier way of speaking and a deficit in an EMI classroom [26]. As the main policy implementers and arbiters of EMI, lecturers can critically revisit the societal definition of EMI, their contextualized understanding of EMI, and the concept of translanguaging, through which they may reach a deeper understanding of the 'English' language in EMI [94,95] and consider the

integration of content and language and confidently build a linguistically responsive and contextually embedded environment, which embraces more openness to local language(s) and students' diverse linguistic/ethnic backgrounds [96]. These discussions could then serve as a basis for making their own teaching decisions and explicitly exploring other translanguaging pedagogies [22].

Finally, a successful transmission from positive translanguaging perception to active translanguaging practice also exists, which can be influenced by sociocultural (i.e., realizing the impossibility and drawbacks of full-EMI classrooms), interactional (e.g., perceived students' difficulties in understanding full-EMI instruction), and personal reason (e.g., multilingual awareness and experienced EMI teaching experiences). In Feng's case (Figure 4), he believed that using multiple language resources could enhance his students' understanding of the learning content, which was his primary goal in his EMI engineering lessons. In his translanguaging practices, he occasionally used Chinese to give an overview of the subsequent English instruction or elicit responses from his students. Feng frequently used familiar examples from his students' Chinese contexts to explain complex concepts. Feng had several years of EMI experience and actively reflected on his previous lessons to develop his multilingual awareness in his teaching practice, as well as to constantly adjust his medium of instruction (MOI) policy and language practices as 'policy arbiters' [96] (p. 541) that implement policy critically by drawing on their knowledge and experience. As underscored by previous research, it is important that lecturers embrace multilingual awareness (e.g., [6,94,97]). Feng's story shows that EMI lecturers' constant reflections on their teaching challenges and coping strategies could be used as a heartening resource for fostering changes in their language ideologies and reform their pedagogies. Moreover, this multi-case study illuminates the potential for future EMI professional development to involve lecturer-sharing seminars in which experienced and novice EMI lecturers can exchange their opinions and strategies to address the tension between L1 and L2 challenges, content learning, and discipline- and academic-specific English learning.

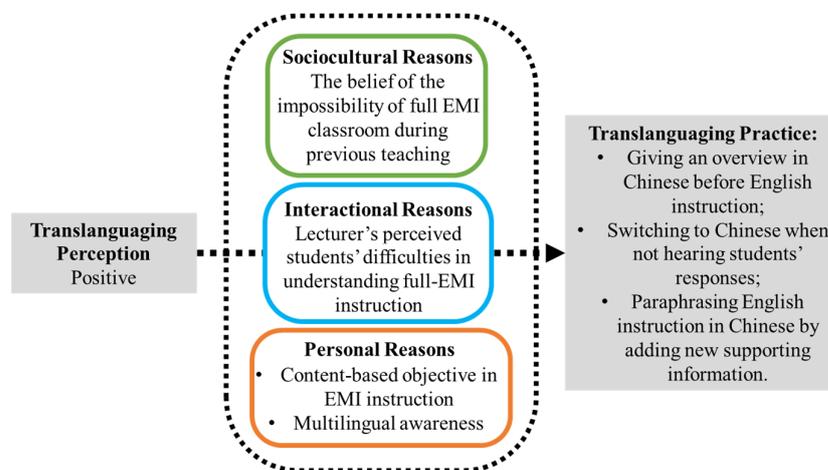


Figure 4. The three-factor mediation model used in Feng's case study.

7. Conclusions

The present study revealed that Chinese EMI engineering lecturers' translanguaging beliefs were not necessarily a direct transition from perceptions to practices because of the interaction effects between interactional, socio-cultural, and personal factors. Overall, our research findings contribute to translanguaging studies in EMI by not only identifying lecturers' translanguaging perceptions and practices separately but also by examining the interrelationship between their thinking and doing. The influential factors in three dimensions can be used as a reference by researchers, lecturer trainers, and policymakers when considering how to close the gap between translanguaging stances and the mobilization of multilingual resources in EMI classrooms. Therefore, we suggest that future EMI training programs invite both experienced and novice EMI lecturers to critically discuss how they

view the role of languages in their classroom and how they practice their translanguaging perceptions in reference to the three-factor mediation model.

However, some limitations provide avenues for future research. First, the three-dimensional interaction model of translanguaging perceptions and practices was built using three cases from EMI engineering courses at a Chinese university. Therefore, researchers should be extremely careful when generalizing our findings to other EMI teaching contexts or other EMI lecturers. Other factors could be added to expand this model. Moreover, this study may fall short of considering students' own translanguaging practices because the students in the observed three classrooms talked for a limited time. However, it would be valuable for future studies to incorporate students' voices and practices.

Furthermore, we focused on comparing and contrasting three lecturers' translanguaging perceptions and practices, in each case to obtain the three major themes. It may be fruitful to further dig into EMI lecturers' complex and sometimes contradicting translanguaging perceptions and practices by focusing on each domain to critically discuss if and how they make lecturers' translanguaging practices meaningful, through which a deeper understanding of the marriage between translanguaging and EMI can be reached to contest and reconstruct EMI classrooms.

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Appendix A. Examples of Interview Questions from the Adapted Translanguaging Pedagogy Survey

How important do you consider the following practices/practices/situations to be in your Precision Engineering EMI course? (Please note that the following scenarios do not necessarily occur in your classroom.)

The options follow below:

- (a) I think this is important in my classroom;
 - (b) I think this is generally important in my classroom;
 - (c) I think this is slightly important in my classroom;
 - (d) I think this is not important in my classroom;
 - (e) Not applicable to my class.
1. Students read materials in English, discuss the content and analyze the language of the text in the integration of Chinese and English.
 2. When students write in English, the teacher encourages students to discuss in the integration of Chinese and English.
 3. When encountering certain specialized concepts, the teacher asks students how they understand the concept in English.
 4. The teacher focuses on integrating multilingual elements in the classroom, for example, showing both Chinese and English explanations of subject-specific terms on the board and in the textbook.

5. The teacher uses the integration of Chinese and English to explain concepts in this subject.
6. When translated into Chinese, the teacher explains to the students the multiple meanings of certain professional concepts.
7. The teacher explains formulas, experimental methods, and experimental procedures in the integration of Chinese and English.
8. The teacher and student discuss the application of information/knowledge/methods in the integration of Chinese and English.
9. When encountering difficult sentences in English, students and teachers analyze the sentence structure in the integration of Chinese and English.
10. When a difficult English sentence is encountered, the teacher and students discuss how to translate the sentence into Chinese.

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