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ELF interactions in English-medium engineering classrooms

Kari Sahan

At many universities, English serves as a lingua franca (ELF) between teachers and students for whom English is not the L1. Despite the spread of English-medium instruction (EMI), empirical research on the nature of teacher-student interaction in EMI classrooms remains limited. This study examines the use of ELF in EMI engineering classes at a university in Turkey to explore how teachers and students use codeswitching as a communicative strategy in classroom interactions. Data were collected and analysed using a qualitative approach. Nearly 14 hours of classroom observation data were collected from three lecturers and analysed according to patterns of classroom interaction and language use. The findings suggest that teachers and students prioritize communicative efficiency over an adherence to monolingual, NS norms in classroom interactions. Pedagogical implications are discussed for ELT specialists tasked with preparing students for academic study in English and supporting content lecturers in EMI settings.

Introduction

As the internationalisation of higher education has established English as a lingua franca in academic settings (ELFA), the number of English-medium instruction (EMI) programs has grown worldwide. EMI is defined as the teaching of academic content through English in contexts where English is not the L1 spoken by the majority of the population (Macaro, 2020). Often, universities introduce EMI programs to attract international students, reduce barriers to student mobility, and prepare domestic students for the international job market (Lin, 2020; Wächter & Maiworm, 2014). As higher education classrooms are increasingly characterized by groups of students from diverse cultural and linguistic backgrounds, English serves as a lingua franca among teachers and students for whom English is not the L1 (Jenkins, 2014; Mauranen, 2012). Therefore, the target interlocutor for students preparing to study in EMI contexts is not necessarily the native English speaker. Instead, students in EMI contexts often interact with lecturers, researchers, and other students from diverse linguistic backgrounds who are engaged in academic work related to that particular field.

In this regard, EMI university classrooms represent a particular ELF situation. ELF refers to 'any use of English among speakers of different first languages for whom English is the communicative medium of choice' (Seidlhofer, 2011: 7), such as between teachers and students who do not share the same L1. ELF research focuses on diversity of language use and 'strongly questions the relevance of native English speaker (NES) norms for all ELT learners' (Galloway & Rose, 2014: 386). As ELF research is committed to highlighting the diversity and fluidity of English use, it recognizes that there is a gap between what students are taught in traditional ELT classrooms and the language they encounter in real-world contexts, including in EMI content classes.

In addition, ELF research has underscored that successful communication depends on the negotiation of meaning in multilingual settings. Cogo (2017: 358) argues that 'ELF does not only concern the English language, but includes other languages depending on the sociocultural context of the communicative exchange, the repertoire of the participants involved and other possible linguistic constraints.' Recognizing the multilingualism of EMI university settings, the study reported in this article attempts to analyse the use of codeswitching in ELF teacher-student interactions to enhance content learning in university classrooms.

Recently, there has been growing interest in the role of language in EMI programs (Kuteeva, 2020; Macaro, op.cit.), where English serves a lingua franca for teachers and students from diverse linguistic backgrounds. Although codeswitching is an oft-cited strategy used in ELF communication (Cogo, 2017), the use of the local language in EMI classes has been described as 'contentious' (Macaro, op.cit.: 271). Nonetheless, research has found that codeswitching is commonly used in EMI contexts: Jiang, Zhang, and May (2019) found that EMI teachers prioritized content learning over language teaching and used pragmatic strategies such as codeswitching during lectures. In Sweden, Kuteeva (op.cit.) found that EMI students' used multiple varieties of English as well as other languages, particularly the local language, in group discussions. Based on the flexible language practices reported by students, Kuteeva (op.cit.; 298) concludes that EMI students' 'idea of what is acceptable is not static and can move along the standard – non-standard continuum.' Characteristic of ELF communication, language practices are highly contextual in EMI contexts. Lin (op.cit.: 624) found that ELF and the local language were used 'on an as needed basis' at universities in Taiwan, with English used to communicate with international students but Chinese preferred for communication between local students, teachers, and administrative staff.

While these studies have highlighted fluid language practices in EMI settings, what is missing from this growing body of research on ELF use in EMI contexts is an examination of how EMI teachers and students construct meaning in classroom interactions. This study aims to address this gap in the literature by examining classroom interactions in EMI university settings in order to understand how English is used as a lingua franca for content teaching and learning. In doing so, this study attempts to draw implications for ELT professionals, in particular language teachers preparing students for EMI study and teacher trainers supporting content lecturers at EMI universities.

The Study

Aims

The study reported in this article aims to build on previous research and to investigate further the use of ELF in EMI university contexts, focusing on one mechanical engineering department at a university in Turkey. Teacher-student interactions in English-medium engineering classrooms are analysed to shed light on how teachers and students negotiate meaning in classrooms where English serves as a lingua franca. By examining codeswitching in ELF interactions, this study suggests pedagogical implications for ELT practitioners tasked with preparing students for academic coursework in English and training content teachers to teach in English. This study was guided by the following research question: How do teachers and students use codeswitching to support content learning in an ELF classroom setting?

Why Turkey?

Turkey was chosen as the research context for a number of reasons. While Turkish is the only official language in Turkey, English is increasingly used for educational, business, and social purposes. EMI has a long history at both secondary and tertiary education levels in Turkey, and, as the number of university-level EMI programs has increased in recent years, researchers have become increasingly interested in the linguistic challenges faced by teachers and students in EMI classrooms (Dearden, Macaro, & Akincioglu, 2016; Soruç & Griffith, 2018). However, what is missing from this growing body of research is an examination of the naturalistic classroom language used by teachers and students for meaning making.

Setting & Participants

Data were collected from three undergraduate EMI courses at a mechanical engineering department at a public university in Turkey in May 2017 as part of a larger study investigating the implementation of EMI education. The participant teachers were three EMI lecturers, each with a PhD in Mechanical Engineering and at least five years' experience lecturing in EMI contexts. The lecturers were all Turkish nationals and L1 Turkish speakers. The class size of each of the observed lectures was approximately 30-50 students. The majority of the students were local, Turkish-speaking students, although the three teachers involved in this study reported that they have 'a few international students in every class' (T3, interview 1). Prior to commencing their EMI coursework, the students had completed the English preparatory program at the university or had passed an English proficiency exam administered by the university's School of Foreign Languages. The students' English proficiency was deemed sufficient for EMI study according to these criteria. The Turkish proficiency of the international students was unknown. Ethical approval for this study was obtained from the researcher's institution and the university at which this study was conducted. To protect the identity of the participants, names have been omitted in the reported findings of this study. Teachers (T) and students (S) are identified by number (T1, T2, T3, S1, S2, etc.).

Data collection

Data for this study were collected through classroom observations, semi-structured interviews with lecturers, and focus group discussions with students. For each of the three EMI classes included in this study, a focus group was conducted with 4-8 students from that class. The lecturers were contacted by the researcher and agreed to participate in the study. Students were informed about the nature of the research prior to the classroom observations and given the option to opt out of the study, although none chose to opt out. Each lecturer's class was observed twice, resulting in approximately 14 hours of classroom observations. Follow-up interviews were conducted with lecturers after each class. Classroom observations were audio-recorded using two unobtrusive recorders, one placed on the teacher's desk and one placed at the back of the classroom. Although video-recording would have captured non-verbal aspects of teacher-student interaction, I decided that the presence of a video camera in the classroom would be too intrusive. Instead, I opted to audio-record the lectures and supplement the recordings with extensive field notes, including aspects of non-verbal communication such as gestures and body language as well as diagrams, figures, and equations written on the board. I consulted the field notes while transcribing and analysing the data to supplement the audio-recordings. Interviews and focus groups were also audio-recorded.

Data analysis

Data were transcribed and analysed using NVivo, a software package that aids in the analysis of qualitative data by helping researchers organise, code, and review multiple data sources. Initially, the transcripts were coded according to speaker, language, and function. Instances of codeswitching in teacher-student interaction were then identified based on the initial coding and extracted from the larger corpus for analysis. Of the 144 instances of teacher-student interaction identified in the classroom observation data, 75 instances involved codeswitching and were analysed using qualitative content analysis for recurring themes. Data analysis was a recursive process in which the transcripts of teacher-student interaction were reviewed multiple times to identify patterns of language use for the (co)construction and (re)negotiation of meaning. Similar procedures were followed to analyse the interview and focus group data. Extracts from the data are presented below to offer illustrative examples of how codeswitching was used in teacher-student interactions.

Results

The findings from the analysis of ELF teacher-student interactions in EMI engineering classrooms suggest that teachers and students utilized codeswitching to facilitate mutual understanding, given the shared linguistic resources in the classroom. The extracts presented below represent a brief sample of the data and naturally occurring interactions between teachers and students for purposes of content learning in mechanical engineering lectures.

Teachers and students used codeswitching as an efficient strategy for the negotiation of meaning. In doing so, they prioritized ease of communication over adherence to NES norms or an English-only approach to EMI. In Extract 1, the teacher

codeswitches to Turkish to fill a lexical gap while instructing students on how to solve a problem:

Extract 1:
T3: Calculate the difference between the upper limit of the specific volume and lower limit of the specific volume. And please measure the distance. Of this two lines by using *cetvel* <ruler>, ha.
S: Ruler
T3: Huh?
S: Ruler.
T3: Ruler. Using ruler, and measure this distance.

Here, the teacher uses the Turkish word for ruler (*cetvel*), presumably because he has forgotten the English word. In response, a student translates the word from Turkish, a language shared by the majority of the students, to English, a language accessible to all students in the class. Codeswitching allows the teacher and students to pull from shared linguistic resources to negotiate meaning in an expedient way. Rather than describe the object in question, the teacher uses a Turkish word, and a student immediately supplies the forgotten English word. In this way, the focus of the discussion remains on the teacher's instructions. The collaborative nature of ELF interaction is exemplified by the student's role in negotiating meaning for the class.

Although the student in Extract 1 provides the English translation of a Turkish word, students' participation frequently occurred in Turkish. In focus groups, students stated that they often asked questions in Turkish because 'we can explain ourselves better' (S5, T2 FG) and 'sometimes our English is not enough' (S1, T3 FG). In each of the classes observed, teachers allowed students to ask questions in Turkish but often responded in English. In Extract 2, a student codeswitches to Turkish to ask a question:

Extract 2
S: *C uh o ivmede, eh altı düşükse, tamamen*-- <C uh at that acceleration, eh if six is low, it's entirely-- >
T1: What's that?
S: *Şu eksi üç, galiba şu ivme sola giderse*-- <That's negative three, I think, if that acceleration goes to the left-- >
T1: *Çok güzel bir soru* <That's a very good question>
S: *Az seviyede, orasi aynı ivme değil, altı* <At a low level, it's not the same acceleration there, it's six>
T1: *Işte bu problem için spesifik*-- <For this problem, a specific-- > For this problem, it is okay. But in reality, if you are uh C, it's going to be the same answer. Okay? It's going to be the same answer, but if this C is let's say attached to another part, which is the second example in your book, then you need to do it like zero point two times uh cosine 60 i minus zero point two times 60 j.

In this example, the teacher codeswitches twice: first, T1 switches to Turkish to encourage the student to elaborate on her question ('*Çok güzel bir soru*'). Then, when responding to the student's question, the teacher switches back to English ('for this problem…'). When asked about this particular instance of codeswitching, T1 explained:

> In order to give an answer right away to her, I explained in Turkish, and then I thought that this question was quite legitimate to explain to everybody, and then I switched to English and I explained it to everybody (T1, interview 2).

T1's use of the term 'everybody' encapsulates the role of ELF, and he uses English to signal that the explanation is important for the whole class. Although English is the language used to 'explain to everybody,' T1 does not prevent the student from asking in Turkish. Rather, he codeswitches to Turkish himself to encourage her as she formulates her thought. T2 and T3 also permitted student participation in Turkish. T2 stated:

> Absolutely questions should be asked in English; questions are normally asked in English, but if we say that, we're taking away the students' freedom of expression (T2, interview 2).

Here, T2's framing of L1 use suggests that language choice is more than a matter of proficiency but also encompasses ideas of self-expression and identity. In the context of this study, codeswitching was a strategic decision made to ease communication and maximize understanding based on communicative resources shared by teachers and students in the classroom.

Codeswitching was also used by teachers to clarify difficult concepts and ensure students' understanding of the content. Teachers provided L1 explanations of difficult concepts because it was 'the easier way' (T1, interview 2) and 'necessary when students do not understand' (T2, interview 2). For their part, students welcomed Turkish explanations at 'critical points' (T1 FG) in the lecture or for concepts that required 'a more detailed explanation' (S1, T3 FG). In Extract 3, T3 codeswitched to Turkish to introduce an important point about the topic:

Extract 3

T3: *Şimdi, bir noktasını anladık, değil mi? Bir noktası, tamam. Şimdi iki noktasının nerede olduğunu anlayacaksınız. Bunu Türkçe anlatayım çünkü örnek çok önemli. Bunu anlamanız lazım.* <Now, we understand point one, right? Point one is okay. Now you are going to understand where point two is. Let me explain this in Turkish because it's a very important example. You need to understand this.>

Although the previous point ('point one') was explained in English, T3 switched to Turkish not only to ensure that students have understood the content but also to signal the importance of the topic. In this instance, the strategy of codeswitching serves to attract students' attention to the upcoming example. Although codeswitching may have been an effective communication strategy in terms of presenting difficult content to local students, the question remains as to how well international students were able to follow Turkish explanations. When asked about the international students in his class, T3 stated that his teaching assistant provided English explanations to them. During classroom observations, the teaching assistant was seen providing English summaries to an international student.

The examples of codeswitching presented this far have demonstrated the ways in which the local language (Turkish) was used to support content learning. In teacher-student interactions, codeswitching to English was also found in L1 utterances, primarily to specify technical terms. In other words, when speaking Turkish, students and teachers often referred to technical concepts in English. The practice of using English terminology in L1 utterances served to reinforce the role of ELFA in EMI classrooms, as teachers and students were not necessarily looking for L1 equivalents of

technical terms even when using their L1 resources to make meaning of academic content. Extract 4 illustrates this point:

Extract 4:
T1: If it happens to be in the positive direction, yes, it could increase the reaction force at B. But because it is decelerating, therefore it helps to move the reaction towards the wheel A. Okay?
S: *Hocam o zaman* inertia *geri bu tarafa olmuş*? <Teacher, then *inertia* is back in this direction?>
T1: Uh huh, yes. Inertia is in the negative direction.

Here, the student asks a question in Turkish but refers to the technical concept under consideration in English (inertia). In each of the interviews and focus groups, teachers and students emphasized the importance of English technical terminology in the field of engineering. English was important 'in order to follow the literature' (T1, interview 1) and because 'Turkish terminology isn't as dominant as English terminology' (T2, interview 2) in the field of engineering. Students in one focus group described the importance of English in terms of the numbers of academic resources available in English compared to the L1 (T1 FG). However, students in this focus group also stated that 'when you get into the technical terms, everything becomes confusing' (S2, T1 FG), because they had not learned technical terminology in their English language support classes. Instead, students learned technical terminology through their EMI content lectures. As a result, some students stated that they did not know the L1 equivalents of English terms (T3 FG) or that 'some of them don't have a Turkish equivalent' (S4, T1 FG). While students' lack of L1 knowledge likely contributed to their use of English technical terms, it also highlights the role of ELFA in many technical fields.

Discussion and Implications for ELT

The aim of this study was to examine how teachers and students used codeswitching to support content learning in ELF engineering classrooms. The findings have suggested that teachers and students use codeswitching to facilitate understanding, encourage student participation, and clarify difficult concepts. Codeswitching to English was also used to insert technical terms in Turkish utterances (see Macaro, op.cit., for discussion of technical vocabulary). In the extracts presented above, teachers and students moved between English—the official medium of instruction and an academic lingua franca—and Turkish—the local language shared by many students—to facilitate communication during the lecture. Their use of codeswitching demonstrates how 'ELF users draw on their bilingual or plurilingual resources (their L1s as well as any other languages they speak in addition to English) in order to… prioritize communicative efficiency over correctness according to ENL' (Jenkins, 2012: 489). Given their shared linguistic resources, teachers and students prioritized mutual understanding and ease of communication over adherence to monolingual norms.

In line with these findings, ELT practitioners working to prepare students for EMI study may consider an ELF-informed approach to language teaching that reflects the flexible patterns of language use and bi-/multilingualism found in EMI classrooms. This suggestion is in line with Galloway and Rose's (op.cit.: 387) call for 'the development of

communication strategies to help students use ELF with an aim of mutual intelligibility and mutual understanding.' The call for an ELF-informed pedagogy is not a new suggestion, as many other scholars (Cogo, 2012; Jenkins, 2012) have called for a move away from monolingual, NES norms in ELT practice and pedagogy. However, this study seeks to consider the implications of this for the growing number of ELT practitioners involved in preparing students for EMI programs. Here, it is important to underscore that I am not advocating for the teaching of ELF, as ELF is not a 'variety' of English which can be taught (Jenkins, 2012; Seidlhofer, op.cit.). Rather, an ELF-informed pedagogy aims to embrace the fluidity of language use and the need for mutual intelligibility over adherence to NES standards of 'correctness.'

This study has demonstrated that codeswitching can be an effective and efficient strategy for improving content comprehension in ELF classroom interaction. However, the findings of this study should be evaluated in light of the linguistic resources shared by the teachers and the majority of EMI students. Unfortunately, international students did not volunteer to participate in focus groups, and as such their perspective could not be incorporated into this study. Languages other than English and Turkish were not found in the data. Previous research has suggested that L1 use in EMI programs may exclude international students by creating divisions between local and international students (Lin, op.cit.) or an 'elite' group (Kuteeva, op.cit.: 296) of students with competencies in both English and the local language. Given the findings of this study (for example, T3's explanation in Extract 3), it is possible to imagine similar dynamics in this research context.

Increasing ELF-awareness among EMI content teachers and students may help to address potential issues of excluding international students through the use of codeswitching. To this end, ELT practitioners should consider adopting an ELF-informed approach to language teaching that not only introduces students to communication strategies such as codeswitching but provides them with the skillset to select which strategies might be most appropriate in certain contexts. Previous research has questioned 'whether resorting to the local language in a linguistically diverse EMI setting is always pedagogically sound' (Kuteeva, op.cit.: 297). ELT practitioners and teacher trainers may be well positioned to provide EMI content teachers with ELF-informed pedagogical training to raise their linguistic awareness and equip them with a range of communicative strategies appropriate for ELF contexts.

Finally, the findings of this study highlight the importance of communicative skills in technical classrooms (Jiang et al., op.cit.). Although students in this study appeared to understand technical terms in English—as evident by their practice of using English terms in Turkish utterances—students reported difficulty expressing themselves in English, resulting in frequent codeswitching. ELT practitioners could address this need for academic communicative competence by providing EMI students with subject-specific language support that incorporates communicative skills. ESP classes for EMI students may need to be revised with the aim of developing students' ability and confidence to discuss subject-specific, technical concepts in English.

By offering illustrative examples of codeswitching in EMI classroom interactions, this study contributes to the growing body of ELF research which aims to 'raise teachers' awareness of the need to re-evaluate ELT practices in light of the changing

demographics of English' (Galloway & Rose, op.cit.: 394). While it is for teaching professionals to determine the applicability of research findings for their own teaching contexts, I would encourage teachers to evaluate the benefits of an ELF-informed pedagogy for preparing students for EMI coursework.

Conclusion

As the number of EMI programs continues to grow worldwide, it is important to understand ELF use in EMI settings. The findings from this study suggest that teachers and students prioritize communicative efficiency in their use of codeswitching for purposes of content learning in classroom interactions. While the language practices and needs of teachers and students in EMI classrooms are likely to be highly contextual and based on local conditions, this study has provided empirical evidence toward the understanding of ELF use in EMI university contexts.

This study is not without its limitations. For one, this study reports on data collected from a small number of lecturers from one university department. Further research is needed to understand how these patterns compare across a larger sample size. Notably, this study was conducted in a context in which the teachers and the majority of students shared an L1 (Turkish). As there were few international students enrolled in the department, different results may be found in university contexts with a greater diversity of L1 speakers. More research is needed to investigate the effectiveness of codeswitching in classrooms with more international students or in classes in which teachers and students do not share a common language other than English. Furthermore, the classes observed in this study were medium-size lectures of 30-50 students. If these classes were much larger (such as large lecture halls) or much smaller (such as seminars), different patterns of codeswitching in teacher-student interaction might have been observed. Future research is needed to understand how these findings compare to other EMI university classes, including other academic disciplines.

(word count: 4000)

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