AN INVESTIGATION ON CLASSROOM DISCOURSE IN EMI COURSES IN TURKISH HIGHER EDUCATION

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DECLARATION OF ORIGINALITY

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ABSTRACT

An Investigation on Classroom Discourse in EMI Courses

in Turkish Higher Education

This study mainly investigated what kind of scaffolding practices EMI instructors used and how these scaffolding practices had an impact on classroom interaction in English Medium Instruction (EMI) courses in a university setting. It also explored the perspectives of both students and instructors regarding scaffolding practices and classroom interaction. The research combined observational data through classroom video recordings, quantitative data through student questionnaires and qualitative data through focus group discussions with students and interviews with instructors. The findings showed that instructors employed different types of scaffolding during different instructional phases: warm-up to topics, transitioning to the main topic, helping students understand, assessment and guiding. The study also classified three levels of interaction in the classroom after the impact of scaffolding practices. In the questionnaire with students and interviews with students and instructors, the participants also recognized the importance of scaffoldings and classroom interaction in EMI courses and offered practical suggestions for improving classroom interaction. Additionally, a framework was designed to analyze scaffolding techniques, which could help EMI researchers utilize the same design for their studies and help EMI instructors create more interactive and supportive learning environments for their students. As a result, this study suggests that although scaffolding practices vary in class, effective scaffolding practices can impact classroom interaction.

ÖZET

Türk Yüksek Eğitim Kurumlarında İDE Verilen Derslerin Söylem Analizi Aracılığıyla İncelenmesi

Bu çalışma, İngilizce Dilinde Eğitim (İDE) verilen derslerde üniversitedeki akademisyenlerin hangi tür destekleyici uygulamaları kullandığını ve bunların sınıf içi etkileşimi nasıl bir etkisi olduğunu üzerinedir. Ayrıca, öğrenci ve akademisyenlerin bu uygulamalar ve sınıf içi etkileşimle ilgili bakış açılarını incelemiştir. Araştırmada video kayıtlarıyla gözlemsel veri, öğrenci anketleriyle nicel veri ve öğrenci odak grup ve akademisyenlerle yapılan görüşmeler aracılığıyla nitel veri kullanmıştır. Sonuçlar İDE veren bölümlerdeki akademisyenlerin destekleyici öğretim yöntemlerini kullanırken farklılık gösterdiğini ortaya koymuştur. Akademisyenler farklı türlerde ve derslerin farklı bölümlerinde destekleyici öğretim yöntemleri kullanmışlardır: derse hazırlık, ana konuya geçiş, öğrencilerin anlamalarına yardımcı olma, değerlendirme ve yönlendirme. Ayrıca, bu çalışmaya göre bu derslerde üç farklı sınıf içi etkileşim seviyesi ortaya çıkmaktadır. Anketler ve görüşmelerdeki katılımcılar İDE derslerinde destekleyici öğretim yöntemlerinin ve sınıf içi etkileşimin önemini kabul edip sınıf içi etkileşimi geliştirmek için bazı önerilerde bulunmuşlardır. Ayrıca, İDE araştırmacılarının kendi çalışmalarında kullanabilecekleri, akademisyenlerin öğrencilerine daha etkileşimli ve destekleyici öğrenme ortamları oluşturmalarına yardımcı olabilecek destekleyici öğretim tekniklerini içinde bulunduran bir taslak tasarlanmıştır. Son olarak, sınıf içinde farklılıklar olsa da bu çalışma etkili destekleyici öğretim uygulamalarının sınıf içi etkileşiminde etkili olabileceğini göstermektedir.

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CHAPTER 1

INTRODUCTION

In recent years, the number of English Medium Instruction (EMI) programs in higher education has increased in both European and Asian nations (Bradford, 2015), and EMI is becoming more prevalent in non-English-speaking settings as a result of internationalization of higher education (Galloway & Ruegg, 2020). Despite EMI programs blooming in non-English-speaking settings to offer internationalized higher education programs to students, studying academic subjects in a second language can present a number of challenges (Walqui, 2006).

When academic subjects are taught in English, majority of students whose first language is not English have various difficulties in EMI courses (Mahan, 2022). For example, EMI students might lack adequate support in EMI courses and their learning might negatively be impacted. According to a study conducted by Burgess, Gibson, Klaphake and Selzer (2010), the absence of adequate support in EMI courses created a formidable obstacle when students transitioned from learning English as a foreign language to comprehending English content. Therefore, one of the challenges that students often face is content comprehension, and whether students comprehend what they are taught throughout the course is central to the success of an EMI course.

To tackle these problems, one of the solutions can be increasing the classroom interaction. Although many researchers acknowledged the importance of interaction, promoting interaction in EMI courses through in-class practices has not been comprehensively studied (Lasagabaster & Doiz, 2022). The literature offers extensive research on EMI topics such as teacher discourse analysis (Basturkmen, 2018), teacher questions for interaction (Genc & Yuksel, 2021), code-switching

(Sahan, 2020), translanguaging practices (Kırkgöz, Inci-Kavak, Karakaş & Panero, 2023), multilingual practices in EMI classes (Smit, 2019), EMI teacher professional development (Macaro, Jiménez Muñoz & Lasagabaster, 2019) and training EMI instructors (O'Dowd, 2018); however research on classroom interaction is limited.

According to researchers (An & Thomas, 2021; Lasagabaster & Doiz, 2022), content comprehension can be facilitated through interactions in EMI courses since students pay their attention to both content and language. To understand the complex concepts, students in EMI courses must actively participate in discussions and in-class tasks in English (Lo, 2013). Moreover, teaching and learning in higher education necessitate the development of higher-order skills (Copley, 2013); therefore, when students are engaged in their EMI courses, they can develop critical thinking skills and advance to higher levels in Bloom's taxonomy. They can apply, analyze, evaluate, and create content in EMI classes when they are interactionally engaged. However, lecturers can often risk content learning and higher-order skills if there is limited interaction between the lecturer and students in the class (Doiz & Lasagabaster, 2023).

Employing scaffolding practices, which refer to the use of various support mechanisms such as contextualizing, modeling or demonstration to help learners understand new concepts and skills (Walqui, 2006) can be one of the approaches to support students and increase classroom interaction in English-medium instruction programs. While scaffolding has been researched extensively in educational contexts, limited research is found in the literature on scaffolding and its effect on classroom interaction in EMI courses. There are a number of studies on student interaction in classroom (Ahlfeldt, Mehta & Sellnow, 2005; Errey & Wood, 2011; Handelsman, Briggs, Sullivan & Towler, 2005; Naiker et al., 2022), and on student

engagement in online education (Dixson, 2015; Gray & DiLoreta, 2016; Louwrens & Hartnett, 2016; Nasir, Janikowski, Guyker & Wang, 2020; Robinson & Hullinger, 2008; Zhang, Lin, Zhan & Ren, 2016). There is, however, limited data on how scaffolding impacts student interaction in EMI courses.

EMI instructors may limit the extent and depth of the content delivered in the absence of proper assistance provided by instructional scaffolding for students to successfully handle information in another language (Hu, 2009). Therefore, implementing instructional scaffolding in the classroom can increase student involvement in the learning process. To date, in the context of scaffolding methods and their impact, a variety of studies have been conducted in higher education settings (Carloni, 2018; Liu, 2020; Proske, Narciss & McNamara, 2012; Wass, Harland & Mercer, 2011). However, although research on student-centered learning in EMI indicates that interaction has a long-lasting effect on the retention of material knowledge (Ismailov, 2022), research on the impact of scaffolding practices on student interaction remains limited in EMI contexts (Ismailov, 2022; Sahan, Rose & Macaro, 2021). This dissertation aims to understand scaffolding practices and how effective they are regarding increasing classroom interaction in EMI courses in a higher education institution.

1.1 Aims of the study

This dissertation aims to understand and uncover specific scaffolding practices of lecturers while they are constructing knowledge together with their students in EMI courses at a state university. For this purpose, field notes and video recordings of the observed lessons were included (Tsui, 2023), and Discourse Analysis was adopted to analyze the classroom interaction between lecturers and students after the lecturers

implemented scaffolding practices to help their students understand content better and increase interaction.

Primarily, the data of this dissertation include four video-recorded classroom observations in each EMI course. In addition, data included survey and interview results of lecturers and students on in-class scaffolding practices and their impact on in-class participation and interaction. Through video recordings, this dissertation aims to discover the types of scaffolding practices EMI instructors employ in EMI courses and show the impact of scaffolding practices on student interaction and whether students respond more to activities when contingent scaffolds are provided according to students' needs. On the other hand, through surveys and interviews with students and lecturers, this dissertation aims to understand participants' views regarding scaffolding practices used in EMI courses and their impact on classroom interaction.

1.2 Research questions of the study

This dissertation responds to three main research questions to uncover scaffolding practices of lecturers and their immediate impact on student-teacher interaction while building content knowledge construction together in the EMI courses of six departments at a state university. Based on instructional discourse analysis, the following research questions were the scope of this dissertation:

1. What kind of scaffolding strategies do EMI instructors use?
2. How does scaffolding impact student engagement? How do students respond to these scaffoldings? Do scaffolds result in a greater number of turns in conversations?
3. What are the perspectives of EMI students and EMI instructors on scaffolding and interaction?

These research questions were formulated and refined before collecting data through dissertation progress presentations, followed by reviews from the supervisors.

1.3 Significance of the study

This study is an important step towards understanding English Medium of Instruction at the university setting in terms of scaffolding practices and classroom interaction between students and EMI instructors. Despite the increasing amount of studies on EMI, most studies in the literature have focused on student interaction only (Ahlfeldt et al., 2005; Errey & Wood, 2011; Handeslman et al, 2005; Naiker et al., 2022) or scaffolding practices (Carloni, 2018; Liu, 2020; Proske et al., 2012; Wass et al., 2011) or student and instructors' perspectives on scaffolding or interaction (An & Thomas, 2021; Carloni, 2018; Ismailov, Chiu, Dearden, Yamamoto & Djalilova, 2021; Pawan, 2008; Mannion, Bangun, Li & Wolgemuth, 2021). However, few studies have focused on in-class practices such as scaffolding in EMI courses (Lasagabaster & Doiz, 2022; Ismailov, 2022; Sahan, 2020). Therefore, this study tries to fill a gap in the literature by both analyzing both students and EMI instructors' perspectives on in-class scaffolding practices and classroom interaction between students and EMI instructors and investigating the scaffolding practices and their impacts on classroom interaction through video-recordings of six EMI courses four times in one semester.

Triangulating the data through both qualitative and quantitative data using classroom observations through video recordings, student questionnaires, student focus group interviews and teacher interviews is rare in the literature and will

therefore fill the gap in the literature by giving an all-inclusive point of view to the readers who would like to understand the EMI context from a broader perspective.

Furthermore, this study fills a gap in the literature by comparing student and teacher perspectives and reveals that students and EMI instructors can have different views on classroom interaction. Both parties might have different expectations of each other, which highlights the need to collaborate on these expectations before starting the EMI courses. Additionally, through student focus group interviews and teacher interviews, this study offers practical recommendations on scaffolding practices and classroom interaction based on input coming directly from both the students and EMI instructors participated in the study.

Finally, this study fills a gap by developing a framework to analyze in-class scaffolding practices. For this study, a framework named "Integrated Scaffolding Practices Framework" was created to analyze scaffolding practices in the observed EMI courses. The first draft of the "Integrated Scaffolding Practices Framework" included scaffolding items from Wood, Bruner and Ross (1976), Walqui (2006) and Van de Pol, Volman and Beishuizen (2010). The framework is comprised of five instructional categories: Warm-up, Transition to the Main Topic, Helping Students Understand Better, Assessment and Guiding. Additionally, these scaffolding items were categorized by their types: Conceptual, Cognitive, Affective and Metacognitive.

This framework was further revised with the scaffolding practices observed in the EMI courses after watching the recorded videos. These scaffolding practices were integrated into the framework in different categories. When the scaffolding practices in the data were added to the framework, it has become more inclusive and data driven. Furthermore, as new researchers observe and investigate scaffolding

practices in EMI courses, they easily expand and update the framework, which makes it a flexible tool for future research.

This framework can also be used not only by EMI researchers but also by EMI instructors. It can remind EMI instructors that various scaffolding practices can be employed in different parts of EMI lectures with different instructional purposes to better support their students. Therefore, this framework can serve as a guideline for new EMI instructors and a reminder for experienced EMI instructors as well as a tool for teacher training. Both the first draft and the final draft of the framework can be found in Appendix B and Appendix C.

1.4 Assumptions of the study

In accordance with the study's research goals, videos of EMI courses were recorded for the purposes of the current study to analyze the teacher-student interaction patterns. In the university's EMI departmental courses, professors and lecturers were assumed to be teaching content mostly in English. On the other hand, translanguaging and code-switching might be present in EMI courses, as such linguistic and conceptual support is available in EMI courses worldwide (Ismailov et al., 2021).

Additionally, all students started their EMI departmental courses after passing the university's required English proficiency test. They might have directly passed the required English proficiency test, or they might have studied in the one-year preparatory language department and passed the required English proficiency test. Therefore, it was assumed that participants in the EMI departmental courses had sufficient English language skills to engage in classroom discussion.

1.5 Definition of terms

Student engagement can be defined as, according to Dixson (2015), “generally, the extent to which students actively engage by thinking, talking, and interacting with the content of a course, the other students in the course, and the instructor” (Introduction section, para. 3). In addition, the actions of students can indicate their involvement in the classroom, which includes general attention, eye contact, and raising hands to ask questions, all of which show interest in the topics being covered (Mandernach, Donnelli-Sallee & Dailey-Hebert, 2011).

English Medium of Instruction (EMI) is defined by Macaro (2018) 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.19).

Scaffolding is also defined as building on what students already know to get to something they do not know (Benson, 1997). In addition, effective scaffolding can be defined as accounting for variances in understanding for a given activity and developing tools and agents to cater to individual needs in the classroom (Tabak, 2004).

CHAPTER 2

LITERATURE REVIEW

In the second chapter, the literature on English Medium Instruction is planned in three sections. The first section contains research findings on the benefits and challenges of English Medium Instructed (EMI) classes. In the second section, various research outcomes are analyzed and categorized into six categories considering global and Turkish contexts. Finally, research on scaffolding practices and classroom interaction is examined through a discourse analytic approach.

2.1 English medium instructed (EMI) classes

When non-language academic disciplines are taught in English in countries where English is not the main language of communication, it is referred to as English-Medium Instruction (EMI) (Jenkins, 2017; Macaro, 2018). The trend in teaching academic subjects in English has begun as a result of the globalization of education brought about by the Bologna Declaration and the European Commission's Erasmus program (Aba, 2013). The Bologna Process has made academic programs at the tertiary level more global through EMI; thus, numerous students have been involved in Erasmus exchange programs around European countries thanks to EMI classes (EC, EACEA, Eurydice 2015). Accordingly, in recent years, higher education institutions across Asia, in addition to Europe, have expanded their English-medium programs and courses for their students to go global and participate in these exchange programs (Bradford, 2015). Additionally, universities are increasingly offering EMI programs to prepare local students for the global workforce (Wächter & Maiworm, 2014). As a result, these changes in universities in non-English-

speaking contexts have led to the internationalization of higher education (Galloway & Ruegg, 2020).

Students in these internationalized environments of higher education may benefit from EMI in several ways. When students study in an EMI discipline, EMI can help them improve their L2 gradually. In their meta-analysis, Lo and Lo (2014) found that students in EMI classes outperformed other students in L2 proficiency, and compared to their peers, EMI students demonstrated higher levels of motivation, curiosity, and learning strategies. This interest and motivation in departmental courses may come from the fact that they have international students in their classes, or students must obtain higher grades to pursue EMI disciplines in exchange programs; as a result, they may feel more driven to achieve.

Su and Kong (2023) also investigated EMI classes in terms of students' perceived benefits and challenges of EMI classes. In this study, an open-ended questionnaire on the perceived advantages of EMI was administered to music students enrolled in an EMI program. Students in the study mentioned improved language proficiency, exposure to diverse cultures, and enhanced English vocabulary as the benefits of EMI classes. For the participants, EMI classes allow them to practice English and improve their language. Additionally, participants emphasized the critical role that EMI plays in helping students increase their vocabulary in English. These results are similar for graduate students in EMI classes. According to Lee, Davis & Li (2021), graduate students in EMI programs are content with the language of their education as their English has improved since the beginning of the EMI program. In particular, their reading and listening comprehension skills improved the most.

To investigate student perceptions of the benefits of EMI, Derakhshan, Rakhshanderoo and Curle (2022) focused on students' and teachers' attitudes about EMI classes. In their investigation, students perceived EMI classes as improving their language proficiency as a result of exposure to English. They can access more sources in English, which also increases their exposure to the language. When the teachers were interviewed, they agreed that their students receive more input and language exposure in English, leading to an increase in their students' language proficiency.

Soruç, Altay, Curle and Yuksel (2021) found similar results regarding language proficiency improvement in EMI disciplines among International Relations and Electronic Engineering students. Although students studying in these EMI disciplines had varying degrees of linguistic challenges when they first started the departmental courses, their language proficiency in English improved over four years. Yuksel, Soruç, Altay and Curle (2021) confirmed these findings with Business Administration and Mechatronics Engineering students. These results prove the fact that advantages of EMI courses on language skills are not confined to a specific subject area. Therefore, using English as a medium of education might be a good way to improve students' general language abilities and prepare them for the worldwide workforce.

In addition to improving their L2, students can view English as an international language as a result of studying in EMI classes. Hino (2017) states that students can change their perspective on English with an international language viewpoint because they are usually exposed to their non-native instructors speaking in English in EMI courses. Input provided mainly by their local instructors allows students to imitate and use English in a more localized way, focusing on creating

mutual intelligibility. In this manner, students and teachers can create their own local English. In one of Hino's open questionnaires, one student commented on their professor's English as "I take her as a model for how a Japanese person should speak English. It is a useful learning experience for me to listen to her English.", and another student remarked as "I think it is more with Asians that the Japanese are actually likely to encounter or work with.... This class is very useful in getting accustomed to non-native English spoken by Asians." These comments clearly suggest that students appreciate the English used in their classes and take it from an international language perspective.

By fostering a global linguistic perspective, EMI students can also have an intercultural perspective in their classes. Students studying in EMI higher education are usually exposed to intercultural experiences since they study with students from a variety of countries, especially when studying abroad. According to Baker and Fang (2021), Chinese students studying abroad in EMI programs participate in multicultural environments and approach their studies from a global perspective. They are also globally aware of world issues and discuss them with their multilingual and multicultural classmates from different countries while being engaged in social groups. Thus, such higher education settings can help them become intercultural citizens of the world (Golubeva, Wagner & Yakimowski, 2016). This also applies to EMI disciplines taught in the home countries. EMI students sometimes participate in Erasmus exchange programs and have international EMI students in their classes. This promotes a multilingual and multicultural atmosphere for EMI students even if they do not study EMI disciplines abroad. Besides, EMI students will speak English as an international language with students from other nations when they are involved in dialogues as global citizens, which will promote a global English viewpoint.

Whether students study EMI disciplines locally or abroad, they typically require assistance since they are not studying in their first language. For this reason, students in EMI courses may need more teacher assistance, and as a result, they can be supported more since their professors are experienced in EMI settings because of their prior international study or job experience. Regarding teacher support, Chang, Kerdsomboon and Koolsriroj (2020) compared students studying their departmental courses in English with the ones studying in their first language in Thailand. The findings demonstrated that students labelled their EMI instructors as more accessible and encouraging. There can be several reasons for this finding. EMI instructors might have studied in a similar EMI discipline before and can empathize themselves with their students. Therefore, instructors in EMI disciplines may be more inclined to support their students inside and outside the classroom, giving EMI disciplines an advantage over the first-language medium of instruction (MOI).

Although there are several benefits to EMI courses, implementing an EMI discipline in a foreign language can lead to some difficulties. According to Macaro (2018), EMI is defined 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.19). When teaching these academic subjects, it is crucial to remember that EMI remains beyond language instruction. In contrast to other content-based approaches, such as CLIL, language acquisition is not given priority in EMI programs (Dafouz & Smit, 2016; Rose & Galloway, 2019). Consequently, learning academic content in another language can present a number of challenges because many students enrolled in EMI programs may not be familiar with academic discourse conventions in English (Walque, 2006).

One of the most quoted challenges in learning academic content in another language is the difficulty in understanding course content (Evans & Morrison, 2011). Su and Kong (2023) examined the advantages and disadvantages of studying music in an EMI discipline and they discovered that majority of the students had difficulty in comprehending the material. One of the participants stated that "Almost all students struggle to comprehend the teachers' instructions" (Su & Kong, 2023, p.5). Given that they have difficulty understanding even basic directions from their lecturers, let alone lectures, this can create a learning problem for students. As a result, inability to understand their teachers will lead them to be less interested in EMI courses.

In such a context, where students are unable to understand the content of the lesson, they will also be unwilling to ask and respond to questions in English. This can stem from insufficient language proficiency of some EMI students. Kaur (2020) examined the difficulties faced by EMI students at a Malaysian university and found that low-proficiency students frequently did not participate in class. Moreover, even when the lessons are student-centered, students who are not proficient enough in English are unable to take advantage of students-centered pedagogy (Jensen & Thøgersen, 2011). In an interactive classroom, students with low proficiency will lack the opportunity to participate in class discussions; therefore, they will have even greater difficulties in an interactive EMI course.

According to Evans and Morrison (2011), the level of difficulty that students face is also determined by a variety of characteristics such as their background knowledge and peer support. For instance, when students have increased readiness with a prepared background, they can adapt to EMI settings more easily. Raffa and Ali (2023) in another study conclude that although many EMI students struggled

with technical terminology, students familiar with the curriculum and having prior knowledge were able to compensate for the comprehension issue. Being prepared before EMI courses might help EMI students overcome their limited English ability and improve their overall academic performance.

Not understanding the lecture and not participating in discussions as a result of being impeded by technical words was also put forward as a challenge in their study by Yıldız, Soruç and Griffiths (2017). In the interviews, students stated that a basic understanding of English was insufficient to succeed in EMI courses. In addition to basic skills, students must learn technical or academic words before beginning the EMI course. Regarding technical terms, one of the students in the study (Yıldız et al., 2017) mentioned that unless they learned the key words necessary for the course before the class, they seldom understood content in their EMI classes. Therefore, being prepared can also help EMI students learn technical vocabulary beforehand. This proactive approach allows them to fully engage in class discussions and better comprehend complex concepts presented by the instructor because the instructors do not spend class time defining the basic technical keywords.

In addition to learning academic and technical vocabulary beforehand, engaging in more productive exercises, such as writing essays, giving presentations and participating in group discussions (Kamaşak, Sahan & Rose, 2021) can prepare EMI students for their EMI courses. Soruç et al. (2021) similarly found that it was challenging for EMI students with limited language proficiency to complete productive activities. Therefore, EMI students can practice production-based tasks before starting their EMI courses.

When EMI students are ready for their EMI courses, they can be more self-confident and have a low-level of stress, which will allow students to participate more actively in class discussions. According to Saudi university students majoring in Computer Science, Engineering and Medicine, most students were psychologically affected by EMI courses in a negative way (Al Zumor, 2019). For instance, in the study, most students felt embarrassed to answer questions in English. Therefore, most students prefer submitting written answers to saying them in front of their friends. This preference for written answers not only hinders their speaking skills but also limits their ability to actively participate in class discussions. Because of the psychological impact of EMI lessons on some students, motivation and confidence levels may suffer, impairing their overall academic achievement.

2.2 Research on EMI context

After exploring the benefits and challenges of the English Medium of Instruction, literature on research studies on EMI is documented across five categories. These categories include the perspectives of instructors and students on EMI, academic success factors in EMI, use of L1 and translanguaging practices in EMI, effective teaching practices in EMI, interaction studies.

2.2.1 Research on perspectives of instructors and students on EMI

In order to understand the opinions of EMI instructors and EMI students, researchers examined the beliefs and attitudes of students and instructors towards English Medium (e.g., Belhiah & Elhami, 2014; Briggs, Dearden & Macaro, 2018; Chapple, 2015; Chun et al., 2017; Dearden & Macaro, 2016; Huang, 2015; Kong & Wei,

2019; Kim, Tatar & Choi, 2014; Joe & Lee, 2013; Muslim & Rohi, 2023; Muthanna & Miao, 2015; Tatzl, 2011; Tsui & Ngo, 2017).

Some studies have found that students' and instructors' attitudes towards EMI courses are positive. Tatzl (2011) analyzed the attitudes of master's degree students studying in business and engineering departments, as well as their EMI professors. According to the study results, master's students and instructors preferred English-language subject instruction. Based on this report, students favored EMI to develop their language abilities and pursue job opportunities throughout the world. For EMI professors, one of the primary motivations for offering courses in English is to increase the department's worldwide popularity so that they can become international universities to attract more foreign students to their departments. Likewise, researchers (Dearden & Macaro, 2016) found that EMI instructors in three different European universities also favored English Medium Instruction in their universities to invite and integrate international students into their departments.

When there are international students in an EMI department, both instructors and students must communicate in English throughout the course. Such a prerequisite may affect how students see EMI courses. In Kim et al.'s (2014) study, Korean students stated in interviews that they needed some explanations in Korean in EMI courses; however, when there were international students in the class, they were hesitant to ask questions and interact with the instructors when they had difficulty understanding. Therefore, Korean students who do not feel comfortable in EMI classes because of their lower proficiency in English tend to have unfavorable opinions about courses in English. International students in the study, on the other hand, do not worry about making mistakes during EMI courses although English is not their first language. They have been found to have higher motivation and

attainment in EMI courses (Huang, 2015). In addition, they tend to feel frustrated when the language of the EMI course switches to Korean, which negatively influences international students' perceptions of EMI departments in Korea. In this context, affective elements can be decisive factors for local students, and their motivation to enroll in EMI courses can be low due to language anxiety. Chun et al. (2017) discovered that Korean students' EMI attitudes are considerably impacted negatively by language anxiety. In other words, those with higher language anxiety usually avoid taking EMI courses and have a negative attitude towards EMI courses. According to the researchers, students' attitudes toward EMI courses may be enhanced by maintaining strong motivation and low language anxiety through effective strategies.

In another study conducted in Korea, Joe and Lee (2013) analyzed the EMI perspectives of sixty-one Korean students from the Department of Medicine. According to the students' pre-test and post-test results for content comprehension of the lectures, neither the medium of instruction had any effect on the degree of student comprehension of the lecture nor was students' language proficiency related to their understanding of the lecture. The results suggest that as medical courses usually involve technical terminology and vocabulary specific to the area, using English as a medium of instruction does not make any difference in material comprehension. However, the survey findings of medical students demonstrate that despite not being a factor in lecture understanding, participants still do not favor English as a medium of instruction. According to the researchers, since English as a medium of instruction has many benefits for students and does not hamper content comprehension compared to Korean as a medium of instruction, students should be informed that they learn similarly when they take an EMI course. Consequently,

when students are fully informed about the consequences of EMI, their unfavorable attitudes toward EMI can be altered.

In the Turkish context, several researchers have examined the attitudes of EMI participants (e.g. Başıbek et al., 2014; Kırkgöz, 2014; Turhan & Kırkgöz, 2018; Macaro & Akincioglu, 2017; Ozer & Bayram, 2019; Ekoç, 2018). Perceptions of Turkish EMI lecturers towards EMI at two partial EMI universities were investigated by Başıbek et al. (2014). In their study, Turkish lecturers mostly saw EMI as a positive experience for students because they could access more materials in English and improve their English proficiency. However, since lecturers believe that students' proficiency levels are insufficient, they recommend offering courses in both English and Turkish media. On the other hand, Turkish lecturers in these partial EMI programs argue that teaching in students' first languages increases their understanding of the lesson. Therefore, the Turkish lecturers in this study support partial EMI programs since students can access courses in both English and Turkish. Similar difficulties arise with full EMI programs. In Turhan and Kırkgöz's study (2018), which focused on teachers' perspective towards EMI, the interview findings indicate that lecturers in a Mechanical full EMI program also preferred EMI since they have more teaching materials in English. However, lecturers have similar concerns such as insufficient proficiency in English and learning the content superficially through English.

As for the perceptions of students on English Medium of Instruction, Kırkgöz (2014) examined and compared senior engineering students from Turkish Medium Instructed programs and English Medium Instructed programs at a Turkish university. Majority of the students in this study believe that the language of instruction is important in shaping their perception of university education and

learning. Students learning in Turkish favored the Turkish Medium of Instruction because they could gain a thorough comprehension of the discipline material, but they acknowledged the possibility of future difficulties in finding work. On the other hand, EMI students preferred the English Medium of Instruction because they had access to original sources and followed the latest trends regarding their disciplinary content while improving their English. However, according to the researcher, the main concern and difference between the two means of instruction among students is the fact that students can easily participate in class discussions and make meanings with their instructors in the Turkish Medium of Instruction, while students in EMI courses cannot easily be an active part of these courses because of their inadequate linguistic skills (Kırkgöz, 2014; Sert, 2008).

In addition to previous findings on student perceptions of EMI, Macaro and Akincioglu (2018) examined Turkish university students' perceptions by comparing gender, year and university variables. The results suggest that although all students participating in the study anticipated EMI positively in general, students in private Turkish universities were more positive about EMI than those in state universities. Students in general selected EMI programs as they could find jobs abroad and pursue graduate studies overseas in addition to improving their English; however, students attending private universities were even more likely to relate EMI with better prospects in the future. Also, among the attending students, female students were more optimistic about EMI and its future advantages, such as improving their linguistic skills, especially pursuing graduate studies. Overall, there may be variations in how EMI students perceive EMI depending on the kind of university and the gender of the participants.

2.2.2 Research on academic success factors in EMI

Beyond the beliefs and views of students and instructors regarding the English Medium of Instruction, numerous studies have explored the academic success factors of students in EMI (e.g., Aizawa, 2023; Dafouz, Camacho & Urquia, 2014; Dafouz & Camacho-Miñano, 2016; Joe & Lee, 2013; Li, 2016; Masrai, El-Dakhs & Yahya, 2022; Rose, Curle, Aizawa & Thompson, 2019; Uchihara and Harada, 2018; Thompson, Aizawa, Curle & Rose, 2019; Vu, 2023; Xie and Curle, 2020). To investigate whether the medium of instruction influences students' academic success, Dafouz et al. (2014) compared students who were instructed in English as a medium of instruction with those instructed in Spanish as a medium of instruction (SMI) at the tertiary level. The coursework and final grades of Business Administration students in both EMI and SMI programs were examined. These findings indicate a comparable success rate between the two groups. This suggests that the medium of instruction, whether English or Spanish, does not significantly affect students' academic performance in Business Administration.

Additionally, studies on EMI Financial Accounting course in Spain (Dafouz & Camacho-Miñano, 2016), on EMI Introductory Chemistry course in Japan (Aizawa, 2023) and on EMI Medical courses revealed similar results and were not affected by the medium of instruction (Joe & Lee, 2013). These results provide valuable insights into the academic success of students when implementing EMI at the tertiary level.

On the academic success of EMI students, medium of instruction may have no impact but proficiency in vocabulary might influence their performance in EMI courses. According to Masrai et al. (2022), vocabulary knowledge influences the academic performance of EMI students significantly. In this study, receptive

vocabulary size of EMI students was measured. At the end, the researchers found a positive correlation between academic success in EMI courses and receptive vocabulary size. Accordingly, EMI students with a larger receptive vocabulary are more likely to perform well in their EMI courses. However, technical-specific vocabulary and aural vocabulary sizes were not considered in this study when evaluating vocabulary knowledge. In research conducted by Uchihara and Harada (2018), while aural/productive vocabulary size played a crucial role in EMI students' active engagement in classroom discussions, there was no statistically significant link between receptive vocabulary knowledge and academic success. Therefore, increasing aural vocabulary size, in addition to receptive vocabulary size, can be explained as a significant factor in academic performance in EMI courses. This conclusion also aligns with Vu's study (2023), which demonstrated that EMI academic success was significantly predicted by both receptive and productive vocabulary knowledge, which are in effect for both content comprehension and active engagement in EMI courses, so students should be equipped with both receptive and productive vocabulary knowledge to support academic success before starting their EMI courses.

In addition to vocabulary knowledge, self-efficacy beliefs may play a role in determining the academic success of EMI students. Students who have higher self-efficacy beliefs can focus on future tasks with specific goals more (Mercer, 2008). The role of EMI students' self-efficacy beliefs on academic performance was also investigated by Thompson et al. (2019). The researchers discovered that students with higher levels of self-efficacy worked harder in their courses. This reveals that EMI success can be predicted based on the self-efficacy beliefs of EMI students.

Additionally, students with higher self-efficacy were reported to have benefited from ESP courses to bolster EMI courses. By expanding academic English, ESP courses can help increase the EMI students' confidence and EMI performance (Thompson et al., 2019). In their study, Rose et al. (2019) and Xie and Curle (2020) also echo similar findings for ESP courses, revealing that ESP grades served as predictors for the academic success of EMI courses. Similarly, another study reported that intensive language courses for freshman students can improve EMI students' proficiency (Lei and Hu, 2014). Therefore, according to Xie and Curle (2020), as business English competence in ESP courses can predict success in EMI courses, students with lower levels of business English should be provided with more linguistic assistance, perhaps through implementation of a sustainable language support program (Aizawa, 2023).

For Rose et al. (2019), the significance of ESP course grades is so high that students with lower levels of English proficiency can benefit to a greater extent and successfully pass the EMI courses, which indicates, as suggested by the researchers, that students with lower levels of English proficiency should not be restricted to enroll in EMI courses. Nevertheless, according to Rose et al. (2019), the English proficiency of EMI students can significantly influence their success levels in EMI courses. Therefore, without a proper language in-service support program, students may experience difficulties. In Li's (2018) study, limited proficiency of EMI students had an impact on their academic success; consequently, their comprehension is affected in EMI courses. As a result, the importance of providing language support to EMI students for their academic success should be highlighted.

Turkish researchers have also worked on research on the academic success factors of EMI students (e.g., Curle, Yuksel, Soruç & Altay, 2020; Kamaşak &

Sahan, 2023; Kaya, Yuksel & Curle, 2022; Soruç, Pawlak, Yuksel & Horzum, 2022; Yuksel et al., 2023). For instance, factors influencing the success of EMI students was analyzed by Soruç et al. (2022) and they discovered that English proficiency, self-regulation and self-efficacy play a significant role in determining EMI success of students in both social science and engineering departments. In other words, higher self-regulation, self-efficacy and English proficiency contribute to success in EMI courses. Additionally, Kaya et al. (2022) have found that having a growth language mindset, compared to a fixed mindset can contribute to success in EMI courses.

Similarly, Curle et al. (2020) investigated the academic performance variables of university students in two different teaching mediums in the Turkish environment. Researchers found that the academic success of EMI students was not significantly predicted by their English proficiency, which is different from the findings of Kamaşak and Sahan, Soruç et al. (2022) and Yuksel et al. (2023). On the other hand, Curle et al. (2020) also discovered that supporting EMI students through courses in their first language can contribute to their academic success in EMI courses. As a result, when identifying determinants of academic success in EMI settings, multiple factors should be taken into consideration.

2.2.3 Research on L1 use in EMI

In addition to academic success variables, many EMI researchers have explored the role of L1 use in EMI courses (e.g., Breeze & Roothooft, 2021; Kırkgöz et al., 2023; Kim, Kweon & Kim, 2017; Kuteeva, 2020; Macaro, Curle, Pun, An & Dearden, 2018; Macaro, Tian & Chu, 2020; Tai & Wei, 2021; Yuan & Yang, 2023). To illustrate this, Kim et al. (2017) explored EMI engineering students' perceptions

regarding L1 use in EMI classes in Korea. Overall, they found that EMI students did not prefer content lessons in English and instead favored the Korean Medium of Instruction because of difficulties in understanding concepts in English. To compensate for the loss in content comprehension, 90% of the students agreed to hear Korean used by instructors in EMI courses whenever needed. This indicates that students acknowledged the significance of using their L1 to improve their understanding of the content.

In some EMI courses, instructors allow their students to use L1 to support content comprehension by creating a translanguaging space for their students. Tai and Wei (2020) stated that translanguaging can help students while integrating their experiences from outside the classroom into EMI courses and constructing class discourse together with their instructors. In another study (Tai & Wei, 2021), researchers explored the translanguaging practices employed by instructors in an EMI math course. When instructors allowed translanguaging, knowledge construction with students increased. As a result, translanguaging practices in in-class discussions helped students learn the content. In summary, these findings emphasize the significance of instructors being adaptable and responsive to students' needs in EMI courses related to the medium of the education.

When instructors decide to switch to L1 in their EMI courses, they may employ L1 for various reasons. Macaro et al. (2020) found that L1 is used rarely by instructors in an EMI institution, but when instructors use L1 in the classroom, they do it to explain the complex content and support comprehension for their students. According to Yuan and Yang (2023), some EMI instructors also use translanguaging to establish rapport with their students. The study found that when students were emotionally connected to the EMI class, they demonstrated willingness to contribute

to knowledge construction with their instructors. The authors observed that the EMI instructors aimed to prepare a welcoming environment that embraced students' L1 experiences. Such an approach can help students feel more comfortable and stress-free in their EMI courses in expressing their ideas while co-constructing knowledge with their instructors. This can also close any gaps that may arise between EMI courses and students due to language proficiency. According to Breeze and Roothooft (2021), Spanish EMI instructors employ fewer translanguaging strategies than their counterparts in other countries, but they use their L1 to encourage interaction, which can assist knowledge co-construction. The authors also found that another use of L1 was to provide key terminological words to support content comprehension.

In the Turkish context, many researchers have also shown interest in the use of L1 in EMI courses. In contrast to the Spanish context in which Spanish EMI instructor tend to use less translanguaging (Breeze & Roothooft, 2021), Turkish EMI instructors are willing to utilize L1 tactically for their own purposes (Kırkgöz et al., 2023). In Kırkgöz et al.'s study (2023), they explored the use of translanguaging practices in a Turkish EMI state university. They found that instructors mostly use L1 to ease comprehension of the content, enhance rapport with their students and manage classroom effectively. Similar results were found in Genc, Yüksel and Curle's study (2023). In their study, they found that lecturers employ translanguaging whenever they need to address content-related problems. These findings align with the ones found in previous results in other countries (Macaro et al., 2020; Yuan and Yang, 2023).

Ataş (2023) also examined translanguaging practices and their functions among EMI Turkish English Literature students and their instructors. According to

results of the study, instructors allow their students to utilize their L1 even in English Literature courses in order to enhance active participation. When students used their L1 to engage in knowledge construction, this improved student participation significantly. In conclusion, incorporating translanguaging practices in EMI classrooms can create a more inclusive and effective learning environment for both students and instructors.

2.2.4 Research on effective teaching practices in EMI

Although translanguaging practices can enhance the effectiveness of EMI courses, they may not be sufficient alone, so it is important to consider that there can be other factors to enhance EMI courses' efficiency. In this regard, EMI researchers have investigated a number of classroom practices that can influence the effectiveness of EMI courses (e.g., An & Childs, 2023; Chin, 2007; Doiz & Lasagabaster, 2022; Genc & Yuksel, 2021; Jiang, Zhang & May, 2016; Pun & Macaro, 2018).

One of the prominent teaching practices examined by EMI researchers is EMI instructors' questions. Whether students understand in a course or not can easily be detected by asking questions and responding to the question (Chin, 2007). According to a study conducted by Pun and Macaro (2018), teacher questions can enhance the quality of interaction in EMI courses when instructors pose higher-order questions such as analysis and synthesis questions. The researchers argue that the type of questions utilized by EMI instructors is shaped by the medium of instruction in EMI courses. In this research, EMI instructors tended to employ L1 in order to ask higher-order questions while some EMI instructors preferred English for their lower-order questions such as factual or closed questions. Additionally, instructors in the study used higher-order questions in L1 to bridge existing knowledge of their

students to the newly presented information in order to construct knowledge together with their students, but according to An and Childs (2023), English proficiency level of EMI instructors can also be an important factor in the use of higher-order questions. In other words, instructors with higher English proficiency tend to ask a relatively higher number of higher-order questions, which might suggest that language skills of EMI instructors play a critical role in the type of questions employed in the EMI courses.

Alongside the distinction between higher-order and lower-order questions, Genc and Yuksel (2021) also examined the questions employed by Turkish EMI instructors in terms of their convergent vs. divergent aspects. While convergent teacher questions typically elicit a short answer, divergent teacher questions necessitate longer answers (Richards & Lockhart, 1994). The findings of the study showed that most of the questions used by the EMI instructors were contingent-based questions, which did not lead to longer answers. Moreover, the researchers remarked that contingent-based questions were mostly text-based and display questions. This conclusion is also consistent with the findings of Dafouz Milne and Garcia's study (2013), where EMI instructors mainly utilized confirmation checks, self-answered questions and display questions, which restricted interaction between the instructors and students. Therefore, EMI students were unable to actively participate in the construction of knowledge with their instructors. This lack of interaction in knowledge construction can potentially hinder students from engaging in deep learning too.

In addition to the questions asked by EMI instructors in terms of effective teaching practices, instructors' spoken meta discourse markers such as "first", "second", "therefore" and "however" in EMI courses can help EMI students with

respect to content comprehension, and this can be regarded as an effective teaching strategy. In a study conducted by Doiz and Lasagabaster (2022), they investigated EMI instructors' meta discourse markers and found that only transition markers such as "but", "so", "and" and "thus" are common among EMI instructors. In an EMI course, the scarcity of meta discourse markers can hinder content comprehension while the integration of a diverse range of meta discourse markers can enhance students' engagement and participation in the classroom. Therefore, training EMI instructors to use more markers can help them enhance their teaching styles in EMI courses.

Furthermore, effective teaching in EMI courses can also be attained through a variety of strategies employed by EMI instructors. For example, the examination of EMI instructors' practices in a study by Jiang et al. (2016) revealed that instructors utilized pragmatic strategies such as repetition and rephrasing to a greater extent to ease content comprehension. Moreover, instructors in the study pragmatically employed code-switching and input enhancement techniques such as circling, coloring and underlying to help their students comprehend especially technical vocabulary in EMI courses. These instructional tactics not only improved students' understanding of the course material but also encouraged their active involvement and engagement.

In addition to pragmatic strategies, accommodation strategies to avoid any breakdown during EMI courses may contribute to a more supportive learning atmosphere for EMI students. Tsai and Tsou (2015) examined six accommodation strategies such as "introducing", "defining", "listing", "eliciting", "giving examples", and "emphasizing". They found that EMI instructors predominantly employ "eliciting" and "emphasizing" strategies to accommodate comprehension, language

and communication challenges in EMI courses. Furthermore, another study suggests that incorporating wait time can be viewed as an effective strategy which can be employed in EMI courses. An and Childs (2023) investigated EMI science classes regarding classroom interaction. When EMI instructors provided extended wait time for their students, it resulted in longer and more complex sentences. This suggests that giving students sufficient time to organize and prepare their responses can improve their language production skills in EMI courses.

2.2.5 Research on interaction in EMI

Active engagement in EMI courses is especially important since EMI students have to deal with the content and language at the same time. In line with this, the absence of interaction between EMI students and instructors may have a negative impact on EMI students (Doiz & Lasagabaster, 2023). Student engagement has been viewed as an integral component of effective learning by a number of researchers (An & Thomas, 2021; Fletcher, 2015). According to Walsh (2011), classroom interaction holds a central position in a learning process. As a result, when there is a lack of interaction, learning process and learning outcomes can be adversely affected.

There have been a number of studies conducted by EMI researchers on the interaction between EMI students and EMI instructors in EMI courses (e.g., Chuang, 2015; Ismailov et al., 2021; Johnson and Picciuolo, 2020; Lo & Macaro, 2011; Sahan et al., 2021). When researching classroom interaction between EMI students and their instructors, it is important to consider the opinions of EMI students to keep them engaged in EMI courses. When interviewed about classroom interaction and its benefits, EMI students in an EMI course in China mostly emphasized the key role of interaction in science lessons as in An and Thomas' study (2021). During the

interviews, some students expressed a tendency to have more discussion during courses. However, despite being aware of the importance of engagement for learning, students in the study showed less enthusiasm for participating in class discussions. Thus, there seems to be a difference between what EMI students believe and what they do during EMI courses. Similarly, most of the students in an undergraduate EMI course in Taiwan also expressed their preference for increased interaction during the EMI courses, but Ismailov et al. (2021) conducted a systematic synthesis of forty studies and discovered that although EMI students are content with the fact that they are studying in an EMI discipline since they can improve their English and find a better job, EMI students still had problems participating in class discussions due to a number of factors.

For the participation issues, some EMI researchers examined the impact of the medium of instruction as a factor that can contribute to classroom interaction. They concluded that when the medium of instruction switches to students' first language, students tend to be more engaged. In their study, Lo and Macaro (2012) compared English as a medium of instruction and Chinese as a medium of instruction in a secondary school, and the findings showed that EMI courses had less teacher-student interaction. In the study, secondary school students started having lessons in English when they entered grade 10. An analysis of this change in the medium of instruction revealed that lessons conducted in English were less interactive compared to those conducted in Chinese in grade 9. Furthermore, the negotiation of knowledge, even regarding unfamiliar words, was rarely observed which might be attributed to the absence of pedagogical strategies such as scaffolding techniques. In addition to students demonstrating higher engagement when instructed in their first language, EMI instructors also contribute to an elevated

level of engagement by asking different questions when they switch back to using their first language as the medium of instruction. Pun and Macaro (2018) investigated the types of questions employed by EMI instructors in English and in their first language. The findings showed that when instructors asked questions in their first language, this has led to increased engagement and higher levels of teacher-student interaction. EMI instructors also utilized more higher-order questions such as analyzing and synthesizing in their courses when they ask questions in their first language. This suggests that using the first language allows EMI instructors to increase classroom interaction positively.

In addition to the medium of instruction, the category of EMI course can influence the level of interaction in EMI courses. For example, some EMI courses are more verbal, and they require more spoken discourse than others. Lo (2014) compared two categories of EMI subjects regarding classroom interaction based on the length of student talk as well as the turns and exchanges of Initiation-Response-Feedback (I-R-F). The findings of the study revealed that there is more interaction between EMI instructors and EMI students in Humanities courses such as Geography and History and more instances of exchanges of I-R-F were observed with longer turns compared to Science & Math courses. As a result, EMI students in Humanities have more opportunities to study in a more interactive setting with more and longer turn taking exchanges. On the other hand, Lasagabaster and Doiz (2023) analyzed the types of questions in humanities, social sciences and applied science disciplines and they found that there isn't any noticeable difference in the types of questions or the level of interaction between the disciplines. According to the authors, EMI courses in these disciplines are often teacher-led and lack interaction, so there may not be a significant difference between disciplines regarding interaction.

As a contextual factor, Sahan et al. (2021) compared two types of universities (elite and non-elite) in terms of level of interaction. The findings revealed that students in an elite university setting had higher level of English proficiency and the level of classroom interaction in English was higher due to less L1 use. On the other hand, students in a non-elite university setting had lower English proficiency and were less willing to participate in EMI courses, so the level of classroom interaction in English was significantly lower in non-elite universities. As a result, it is important to consider any potential variations in EMI implementation between different institutions. Another important factor in the implementation of EMI is whether the instructor is a native speaker of the language or not. In An, Macaro & Childs' study (2021), the EMI researchers examined the practices and the level of interaction of EMI instructors whose first language was English. The results of the study showed that EMI courses with instructors whose first language was English still lacked interaction between the instructors and the students. Therefore, interaction in EMI courses cannot be guaranteed by instructor's language proficiency alone. This necesitates for further research on instructors' classroom discourse and its effect on student engagement in EMI classrooms.

Regarding teacher-student interaction in EMI courses, Johnson and Picciuolo (2020) conducted a survey on EMI instructors. The findings of the survey revealed that the level of interaction in the class is hindered because EMI instructors do not have enough time to cover all the materials. Therefore, many EMI instructors prefer adopting a teacher-led approach and focus on delivering the content only within the designated class hours (Ismaliov et al., 2021). Due to time constraints, the quick delivery of the content in English can result into a non-interactive class setting in a

teacher-based course, and therefore there may be a need for a slower pace in content delivery.

In Chuang's study (2015), students were conducted a survey on their EMI instructor's pedagogical practices and their effect on promoting interaction. The findings showed that EMI students were pleased with the way their EMI courses were conducted as they were more engaged in class work because their EMI instructors taught at a slower pace, used more simple vocabulary to ease content comprehension along with occasional code-switching to L1 and implemented more in-class activities to enhance classroom engagement. Thus, the teaching methodology of EMI instructors seems to significantly influence the level of classroom interaction. In another study (Lee, 2014), the teaching styles of seven EMI instructors in different courses were investigated. In the observed EMI courses, there was little or no class interaction in lecture-centered and presentation-centered EMI courses. However, students with different levels of English were able to actively participate in class discussions in EMI courses that required participation. These results suggest that factors related to methodology can play a critical role in fostering interaction among students.

2.2.6 Scaffolding practices in EMI and discourse analysis

As a component of classroom discourse, research on scaffolding practices in EMI has also gained significant attention in recent years as EMI researchers aim to explore the diverse strategies and techniques employed by instructors to assist students in comprehending and engaging with content in English.

In the context of classroom discourse, Sociocultural theory offers a framework for investigating scaffolding practices implemented in EMI courses, and

also classroom interaction between the instructors and the students can be explored through the lens of Sociocultural theory (Antón, 2015). As interaction plays a crucial role in constructing conceptual maps, facilitating the internalization of concepts (Negueruela-Azarola, García & Buescher, 2015), the language used in the classroom becomes especially important, particularly in EMI courses where concepts are taught in another language. According to Vygotsky, the language required for everyday topics differs from the language needed in academic contexts because speakers need to be more conscious in an academic setting (Mahn, 2015). To illustrate, academic language employed in EMI courses can often be decontextualized in comparison to everyday topics. Therefore, to facilitate concept building, EMI instructors can utilize "bridging" as a scaffolding technique, connecting the academic setting to students' prior experiences (Gonulal, & Loewen, 2018). Hence, the language and the delivery of academic concepts in EMI courses should be consciously planned through scaffolding practices so that these academic concepts are constructed in mind in a more interactive matter.

Before examining scaffolding practices, it is sensible to explore instructors' opinions on these practices. In Pawan's study (2008), for instance, 33 EMI instructors participated in a professional development program and they were subsequently surveyed on their scaffolding practices in their courses. When the instructors were asked about their opinions on scaffolding, only half of them agreed that scaffolding was important. Around 20% of them thought that it was the responsibility of EMI instructors to support EMI students via scaffolding practices. These percentages may show that awareness among EMI instructors should be increased regarding the role of scaffolding in enhancing EMI learning experiences.

Mannion et al. (2021) in their study explored an EAP instructor's views on scaffolding practices. The EAP instructor pointed out the importance of scaffolding practices such as cognitive and metacognitive scaffoldings. When the EAP instructor's courses were observed, her in-class scaffolding behaviors aligned with her views, so differences may exist among instructors regarding the perceived importance of scaffolding practices and their actual implementation. In addition to the perspectives of EMI instructors, it is important to take into consideration the views of EMI students regarding the use of scaffolding practices. To illustrate, Carloni (2018) conducted a study on perspectives of graduate and undergraduate EMI students on scaffolding practices in an EMI course. The findings of the study showed that scaffolding practices are noticeable by EMI students and using discourse markers and accommodation strategies as a scaffolding were particularly important for the EMI students to maximize their potential level.

In this respect, the Zone of Proximal Development (ZPD) within Sociocultural theory offers an explanation for scaffolding. According to Vygotsky (1978), ZPD is "the distance between the actual developmental level, as determined by independent problem solving and the level of potential development, as determined through problem solving under adult guidance or in collaboration with more capable peers" (p. 86).

In an EMI course, since scaffolding practices are provided by a more capable person than students, the gap between students' current level and their potential level can be closed through scaffoldings. According to Davis and Miyake (2004), scaffoldings refer to the help provided to a student for tasks that would otherwise be beyond their ability to complete independently. As English is not the first language of students, EMI students can encounter difficulties in their courses and scaffoldings

can facilitate their progression from one level of understanding to another, particularly within the context of classroom discourse.

In a classroom, all forms of communication that occur within a classroom are collectively referred to as classroom discourse (Jocuns, 2012), and according to Walsh (2011), classroom discourse can be analyzed through either Interaction Analysis, Discourse Analysis or Conversation Analysis. In Conversation Analysis, interaction data is analyzed in a bottom-up manner (Seedhouse, 2005), meaning there are no predefined criteria guiding the perspective on the data. Through conversation analysis, researchers can analyze micro-details of a conversation, such as hesitations and micropauses (Sert, 2015). However, interaction facilitated by scaffolding practices conducted by EMI instructors can be investigated within the Discourse Analysis approach (Sinclair & Coulthard, 1975) since classroom discourse data is evaluated against predefined scaffolding criteria and various multimodal communication elements can be analyzed such as visuals and gestures.

In addition, in Discourse Analysis, the focus is on words and utterances above the level of sentence, examining how they function in context (Walsh, 2011). In an EMI context, words and utterances are crucial for content comprehension since students are studying their courses in another language. When EMI instructors intend to scaffold their students in order to facilitate comprehension, they must consider the proficiency level of their students. Accordingly, they may need to simplify their language or they may provide additional examples to ensure scaffolding takes place within the students' Zone of Proximal Development (Roehler & Cantlon, 1997). Hence, given the fact that the diverse types of scaffolds are employed for various purposes in EMI courses, Discourse Analysis makes it possible to ascertain the methods, objectives, and purpose of scaffolding practices within classroom discourse

by systematically separating and examining their organization and structure (Wood & Roger, 2000).

Utilizing Discourse Analysis as an approach to analyze scaffolding practices and exploring classroom interaction within the framework of Sociocultural theory are important. This is because classroom concepts are collectively constructed within a social context through scaffolding practices among EMI students and EMI instructors (Lantolf, 2000). Therefore, the language employed in scaffolds while constructing meaning with EMI students should be taken into consideration by EMI instructors (Mojdehi & Zarei, 2023). In this perspective, Discourse Analysis can provide significant examples of social interaction triggered by scaffolding practices through the analysis of language used and its purpose. For example, Doiz and Lasagabaster (2022) conducted a study by using discourse analysis. They investigated meta discourse markers such as "but" "so" or "and" among EMI instructors. It is important to note that such discourse analysis studies can also facilitate collaboration between EMI researchers and EMI instructors to improve classroom discourse. Research on scaffolding practices within Sociocultural theory through discourse analysis can also aid EMI instructors in maximizing their instructional effectiveness.

Scaffolding which involves providing structured support to students within their ZPD can foster classroom interaction, but it differs from a simple teacher support (Gonulal & Loewen 2018). Firstly, scaffolding practices fostering interaction should aim to support students' performance, not their products (Puntambekar & Hübscher, 2005). Teachers can guide students with their scaffolds as well as support content comprehension. Additionally, scaffoldings should be removed when students do not need them anymore (Sharma & Hannafin, 2007). Gradually fading the

scaffolding can encourage students to become more actively engaged in classroom interaction (Fretz et al., 2002). Fading scaffolding in a controlled manner aligns with the concept of ZPD as students initially perform tasks with support and gradually transition to perform these tasks independently. Finally, according to Van de Pol, Volman and Beishuizen (2012), contingency rule is a vital element of scaffolding. The support provided by instructors should be delivered only when students require it, neither before nor after. When students are capable of performing independently, instructors should transfer the responsibility of interaction to them. Accordingly, scaffolds should be adaptable based on students' level of knowledge and understanding. Therefore, “Helping learners perform in their ZPD and extending their actual developmental level is the essence of scaffolding” (Cazden, 2001, p. 71). Achieving this adaptation is only possible through social interaction and the implementation of dynamic assessment strategies (Gonulal & Loewen, 2018; Lajoie, 2005; Shepard, 2005). As a consequence, effective scaffolding practices should be tailored to students' backgrounds, provided when necessary, gradually faded when no longer required, and ultimately, the control of interaction is transferred to the students. With these criteria in mind, effective scaffolding practices can be evaluated based on these pre-set standards through discourse analysis while EMI instructors and EMI students collaborate to construct meaning in a social discourse context.

As EMI instructors need to scaffold their EMI students within their ZPD, the language used by instructors during scaffolding becomes crucial. If the language used in scaffolding is beyond the ZPD, the language may not be appropriate for the level of the students. In such cases, this may not be considered as scaffolding as it violates the principles of contingency and adaptability inherent in scaffolding interventions. Therefore, for effective scaffolding the right amount of challenge

should be provided with the ZPD of students (Van de Pol & Elbers, 2013). The right of amount of challenge within the ZPD can also be explained by Wood et al.'s contingency shift (1976) in scaffolding: Instructors can provide more assistance when students require it, and they gradually reduce support when students no longer need it. In conclusion, instructors can either adjust their language by simplifying their words and sentences or enhance students' comprehension by providing amplifying examples. The language employed in these scaffolding practices can be analyzed through discourse analysis based on preset criteria.

Related to the language used by EMI instructors, Ho, Kwai Yeok Wong and Rappa (2019) investigated the classroom talk of Biology teachers as a scaffolding strategy in a high school. The researchers were especially interested in "talk moves" in which the biology teachers utilized some elaborative questions to engage their students in discussions while drawing biological concepts. In the study, the teachers were prepared to use "talk moves" beforehand when commenting on the conceptual sketches of their students. When students needed correction on their conceptual sketches, they were intentionally provided with "talk move" scaffoldings to co-construct knowledge with their students. The results of the study showed that dialogic prepared talk moves by teachers, such as eliciting and probing answers, served as a scaffolding strategy, engaging students meaningfully and facilitating the construction of knowledge together with their students. Hence, instructors in EMI or CLIL courses should possess higher levels of teacher language awareness to scaffold their students appropriately within their ZPD (Daozhi & Harfitt, 2019).

When instructors have explicit knowledge of the language used in the medium of the course, they can provide scaffolding more effectively by adjusting their language to their students'. According to Daozhi and Harfitt's study (2019),

EMI instructors utilized scaffolding strategies that required linguistic awareness in EMI courses, and in the study strategies such as “mediation”, “probing for expansion”, “translation” were employed to support content comprehension based on the proficiency level of the students. As a result, the linguistic awareness of EMI instructors seems to have helped them understand the correct timing to employ and withdraw scaffolds for their students. When the scaffolds provided to students are language-sensitive, EMI instructors can assist EMI students more effectively since language-based scaffolding practices are frequently utilized in EMI courses.

In EMI courses, a variety of scaffolding practices are employed. For instance, Banegas and Manzur Busleimán (2021) found scaffolding practices such as simplifying text by using short sentences and easy words in an online teacher education in Argentina as a scaffolding strategy. Additionally, multimodal scaffolding was frequently employed to aid content comprehension. When instructors amplify the EMI context with multimodal scaffolds, EMI students get more opportunities to interact with the content through visuality and other clues (Fernandez-Fontecha, O’Halloran, Wignell & Tan, 2020). Within multimodality, EMI instructors can also employ gestures and facial expressions to scaffold their students (Forey & Polias, 2017). This multimodality will give options to select from a variety of scaffolds (Puntambekar & Hubscher, 2005). To illustrate, Fernández-Fontecha et al. (2020) used visual thinking technique as a part of multimodal scaffolding to address language challenges in CLIL courses. The authors analyzed these instances of multimodal scaffolds through discourse analysis, and the results revealed that these visual thinking scaffolds amplify the input provided to students and aid in their better comprehension of the content. When comparing the effects of simplifying content for EMI students versus amplifying it, research has shown that

employing amplifying scaffolding strategies empowers students with greater autonomy in class discussions by providing them with the necessary language and cognitive resources (Gibbons, 2015). Discourse analysis here can help EMI researchers analyze these scaffolds from a multimodal perspective and evaluate them based on the simplify-amplify continuum.

In addition to simplify-amplify classification, classroom scaffoldings can be categorized based on Walqui's six strategies (2006). These are modeling, bridging, contextualizing, schema building, developing metacognition and re-presenting text. These scaffolding strategies can assist students in comprehending complex texts by equipping them with the necessary tools. Scaffolding EMI students metacognitively is important to make the EMI courses more student centered. When students develop metacognitive abilities, they can become independent and lifelong learners (Mannion et al., 2021). Therefore, EMI courses can be designed to offer more metacognitive scaffoldings to their students.

Classroom scaffoldings can also be classified based on their intentions and means (Many, 2002; Silliman Bahr, Beasman & Wilkinson 2000; Van de Pol et al, 2010). The intentions of scaffolding practices are categorized as Direction maintenance, Cognitive structuring, Reduction of the degrees of freedom, Recruitment, Contingency management/frustration control. If the goal of a scaffold is direction maintenance, then instructors should guide students toward a specific target. This direction may have a metacognitive effect on students. If the goal of a scaffold is either cognitive structuring or reduction of the degrees of freedom, students are supported cognitively as instructors can organize the content or simplify tasks to enhance comprehension. On the other hand, if the goal of a scaffold is recruitment or contingency management/frustration control, instructors can assist

students in managing their emotions better by directing their focus on tasks or motivating them using various tools. Additionally, Van de Pol et al. (2010) introduced another framework based on means for analyzing scaffolding practices. In this framework, tools to support students while scaffolding involves giving feedback, providing hints, instructing, explaining, modeling, and questioning. This categorization of intentions and means (Many 2002; Silliman et al. 2000; Van de Pol et al., 2010) can aid EMI researchers in analyzing scaffolding practices employed by EMI instructors.

Finally, scaffolds in the classroom can be analyzed based on their types. They can be procedural scaffolds, conceptual scaffolds, cognitive scaffolds, metacognitive scaffolds, strategic scaffolds and affective scaffolds. These classifications have been made by various researchers (Hannafin, 1999; Hill & Hannafin, 2001; Nedić, Jošić & Baucal, 2015; Xun and Land, 2004; Zheng, 2021). For instance, Tajeddin and Kamali (2020) examined the typology of scaffolding strategies by building a corpus of classroom instruction. Through discourse analysis, researchers identified four categories of scaffolding strategies employed in the classroom: meta-scaffolding, linguistic scaffolding, affective scaffolding and under-scaffolding. Meta-scaffoldings guided students explicitly on how to approach a problem, and linguistic scaffolding equipped students with vocabulary and language skills needed for content comprehension. Students' emotional and motivational needs were addressed via affective scaffoldings. When instructors provided insufficient support to concepts or misscaffolded their students, this was labelled as under-scaffolding. The findings revealed that more than one type of scaffolding was presented to students simultaneously. For example, sometimes both meta-scaffolding and affective scaffolding were available for the students. Additionally, multiple scaffolds from the

same category were used such as modeling and extension at the same time. In short, employing multiple scaffolding strategies as well as the variety of scaffolds can also enhance students' learning.

The observation of a variety of scaffolds used in a classroom context was noted in Li and Zhang's study (2020). The study reported that teacher scaffolding should be tailored to meet the specific needs of students by avoiding the provision of unnecessary scaffolds to promote learner independence. The findings align with the conditions of effective scaffolding (Van de Pol et al., 2010) in terms of contingency and transfer of responsibility. In other words, students received more scaffolding when they had difficulties, and when they were able to succeed on their own, the level of scaffolding was reduced. The findings suggest that adjusting the intensity of scaffolds based on the assessment of students' levels before providing support can enhance the level of interactions as well. This is a crucial fact that teachers and teacher educators should recognize for the implementation of effective scaffolding. The study used discourse analysis methodology, and its findings indicate that scaffolding strategies vary depending on whether students are involved in lower or higher-level Bloom's taxonomy activities. For lower-level activities, instructors frequently scaffolded their students by simplifying the content through modeling or marking. On the other hand, when higher-level activities were presented, amplifying scaffolds such as contextualizing and meta-cognitive strategies were provided. When suitable scaffolding strategies implemented, educators can guide their students in both lower and higher-level thinking activities, which can both help the content comprehension and foster the development of critical thinking skills.

In this context, Tajeddin, Alemi and Kamrani (2020) investigated scaffolding strategies and their functions in EMI science courses. The study revealed that

teachers tailored scaffolding strategies based on the individual needs of their students, thereby fulfilling the contingency requirement of effective scaffolding (Van de Pol et al., 2010). However, these scaffolding strategies were predominantly cognitive and conceptual scaffolds to facilitate the comprehension of scientific technical words and the number of metacognitive scaffolds was limited. For example, teachers utilized bridging, schema-building, modeling and representation as scaffolding techniques. Additionally, teachers commonly simplified concepts through reducing degrees of freedom and frustration control. These scaffolding techniques helped students better understand the complex concepts, but it is noteworthy that metacognitive scaffolding strategies could foster students' autonomy. Therefore, employing different types of scaffolding practices is critical to enhance the learning and interaction of EMI students.

Employing different types of scaffolding practices can also vary based on the nature of the discipline and the specific course. For instance, Mahan (2022) focused on an EMI high school classroom, analyzing the scaffolding practices across three different course types: science, geography and social science. Overall, EMI instructors in this study mostly scaffolded their students conceptually by matching unknown L2 concepts to familiar L1 concepts. They gave technical words and mostly supported comprehension visually. However, students in these courses were not provided metacognitive support. The findings also showed variations in scaffolding practices across natural science (science and geography) and social science disciplines. In natural science courses, students received more examples and visual aids such as videos, pictures, tables and body language gestures to support content comprehension compared to social science courses. In spite of the abundance of scaffolds in natural science courses, there were shorter turn-taking exchanges and

less interaction. On the other hand, students in social science courses engaged in more discussions through referential questions and personal examples provided by the instructors. This suggests that scaffolding practices and their effect may change depending on subject. This variation emphasizes the importance of different scaffolding practices to meet the specific needs of different disciplines, which can maximize academic learning within an EMI setting.

In addition to academic benefits for students, scaffolding practices may also have a psychological effect on EMI students. For example, Mojdehi and Zarei (2023) examined the impact of scaffolding on writing anxiety among IELTS students. They compared the influences of peer, reciprocal and distributed scaffolding practices in their study and found that reciprocally provided scaffolds contributed to lower levels of anxiety among students, which shows that discussion-based interaction through scaffolds between instructors and students is beneficial to diminish the anxiety. In this study, peer scaffolding was also observed, but its effectiveness was less than reciprocal scaffolding, which suggests that the teacher influence plays a more important role in the success of scaffolding. These findings highlight the importance of a supportive teacher-student relationship while providing scaffolding practices.

As a good teacher-student relationship is critical for the success of scaffolding interventions, students might be more willing to participate in discussion-based interactions when they perceive support from their teachers through their first language. In Liu's discoursal analytic research (2020), teachers in secondary schools in Hong Kong utilized translanguaging and trans-semiotizing practices to teach both general and technical vocabulary as well as academic writing. Although these practices were temporary help to their students, teachers were able to construct knowledge collaboratively with their students through verbal and visual scaffolding.

The approach of integrating students' first language with various scaffolding may have enabled students to actively participate in their learning process. As a result, through the incorporation of verbal and visual scaffolding as resources, teachers in this study successfully created a more inclusive and engaging learning environment and students successfully benefitted from scaffoldings provided.

In addition to the success of scaffolding, interaction can be assessed through students' responses to the scaffolding. When scaffoldings are provided to students, their responses can vary in length and sometimes responses can be short like "yes" or "okay", but sometimes they can be longer with more explanations. To assess interaction after scaffoldings, number of turns can be taken into consideration. According to Hall (2011), the number of turns after a scaffolding intervention can indicate whether the interaction is extensive or short. In a conversation, Initiation, Reply and Evaluation (IRF) circles of conversation turns (Sinclair & Coulthard, 1975; Sinclair, 1987) can take place between the instructors and students. Firstly, instructors usually start a conversation on a topic (Initiation), then students respond (Reply) and finally, instructors give feedback (Evaluation) in an exchange format. When this exchange format is repeated or extended, it can indicate a good level of engagement for the students involved in this format (Macaro, Akincioglu & Dearden, 2016).

Instructors can extend this exchange format further through sequences like I-R-F-R-F (Tang, 2020) or more like I-R-I-R-I-R-I-R-I-R-I-R-F (Ismaliov, 2022), by providing scaffolding (Pun & Macaro, 2018). To illustrate, An et al. (2021) examined classroom interaction in EMI high schools by comparing native and non-native teachers through discourse analysis. The authors assessed interaction using five parameters, including the extended IRF circles. The findings of the study

revealed that extended IRF circles were not commonly observed in the EMI courses. Furthermore, follow-up questions were not utilized to enhance the interaction, regardless of whether the teacher was native or not. As a result, this study underlines the fact that classroom interaction in an EMI course is not related to the proficiency level of the instructors only. Some other factors such as the use of scaffoldings should be the focus of research. For instance, in Ismailov's study (2022), content instructors at an EMI university underwent training which focused on IRF circles and the types of questions to be used to enhance classroom interaction. Throughout the training, these instructors practiced these interaction strategies. Following the training, they utilized more extended IRF circles with their students, resulting in an observed improvement in the quality of interaction in their classes. This kind of training called "Interactive Lecturing" in the study shows that classroom interaction can be enhanced by utilizing some strategies consciously.

Overall, research conducted to date has highlighted the importance of active engagement of students to improve their success in their studies (Robinson & Hullinger, 2008). However, numerous studies consistently have shown that a lack of interaction is commonly observed in EMI courses (An et al., 2021; Dalton-Puffer, 2007; Lin, 2006; Lo & Macaro, 2011; Yip, Coyle & Tsang, 2007). This lack of interaction in EMI courses can be reduced through scaffolding interventions to enhance the comprehensibility of EMI content. Although there are some studies conducted on scaffolding and interaction (Ismailov, 2022; Hermkes, Mach & Minnameier, 2018; Van de Pol et al., 2010), there is a limited number of studies focusing on the impact of scaffolding on classroom interaction. The number of studies addressing classroom interaction is even lower within the context of EMI (Macaro et al., 2018). Hence, this dissertation will analyze the implementation of

scaffolding interventions by EMI instructors using a coding scheme. Additionally, it will assess the impact of scaffolding practices on student engagement by examining the frequency of extended IRF circles in a Turkish state EMI university. Therefore, this dissertation aims to address the following research questions:

1. What kind of scaffolding strategies do EMI instructors use?
2. How does scaffolding impact student engagement? How do students respond to these scaffoldings? Do scaffolds result in a greater number of turns in conversations?
3. What are the perspectives of EMI students and EMI instructors on scaffolding and interaction?

CHAPTER 3

METHODOLOGY

3.1 Research questions

The main objective of this dissertation is to examine the scaffolding interventions employed by EMI instructors in their EMI classes. Consequently, the first research question focuses on the types of scaffolding utilized by EMI instructors during the delivery of their EMI courses. Secondly, it is essential to determine whether these scaffolding interventions contribute meaningfully to the creation and enhancement of classroom interaction between EMI instructors and EMI students. Therefore, the second research question concentrates on evaluating interaction after scaffoldings. Finally, asking the opinions of EMI students and EMI instructors on scaffolding and interaction is also important to understand the differences between students and the EMI instructors. In summary, the following research questions will guide the investigation:

1. What kind of scaffolding strategies do EMI instructors use?
2. How does scaffolding impact student engagement? How do students respond to these scaffoldings? Do scaffolds result in a greater number of turns in conversations?
3. What are the perspectives of EMI students and EMI instructors on scaffolding and interaction?

3.2 Research context

This study was conducted at Gebze Technical University. Before commencing this research, ethical permission for the study on classroom discourse in EMI classes was granted by the Human Research Ethics Committee at Gebze Technical University

(see Appendix D). This university is an English Medium of Instruction (EMI) tertiary institution located in the province of Kocaeli in Turkey. As a state university, Gebze Technical University began its education as graduate education in 1992 under the name Gebze High Technology Institute. In the following years, it started providing education to undergraduate students and in 2014, it was established as a university under the name Gebze Technical University.

Gebze Technical University is recognized as one of Turkey's 10 research universities, and consequently, it has implemented an English Medium of Instruction (EMI) policy across most of its programs. Within its four faculties, the university offers a total of 18 undergraduate programs. Among these programs, the Faculty of Engineering hosts 10 departments: Computer Engineering, Biomedical Engineering, Environmental Engineering, Electronics Engineering, Industrial Engineering, Civil Engineering, Geomatics Engineering, Chemical Engineering, Mechanical Engineering, and Materials Science and Engineering. While the Electrical Engineering and Materials Science and Engineering departments partially implement EMI, the Geomatics Engineering department follows a Turkish Medium of Instruction (TMI) approach. The rest of the departments operate as fully EMI programs.

In the Faculty of Basic Sciences, there are departments of Physics, Chemistry, Mathematics, and Molecular Biology and Genetics, all of which are fully English-medium departments. Similarly, in the Faculty of Aerospace Engineering, Aerospace Engineering is also a fully English-medium department. However, in the Faculty of Business Administration, while Business Administration is a partially English-medium program, Economics, Strategy Science, and Management Information Systems are fully Turkish-medium programs. Lastly, in the Faculty of

Architecture, Architecture is a partially English-medium program, whereas Urban and Regional Planning and Industrial Design programs are fully Turkish-medium programs.

For both fully and partially EMI programs listed above, students are required to take a proficiency examination to demonstrate their ability to pursue their studies in English within their respective EMI departmental courses. If students enrolled in EMI programs fail to pass the proficiency examination at the beginning of the academic year, they have two options: they can either enroll in a one-year intensive English preparatory course or provide a certificate from an official English language exam such as TOEFL or the state-prepared YDS exam.

The one-year intensive English preparatory course consists of two semesters. The first semester lasting 17 weeks, starts in September and ends in January while the second semesters lasts 17 weeks, beginning in February and concluding in June. In this program, students study general English, including main course and skills books. Main course books cover all four language skills and skills books focus on reading and writing within an academic context. At the end of this program, students take the proficiency examination in June. If they pass the exam, they can proceed to study in their EMI programs in the following semesters. However, if they do not pass, they have the option to retake the proficiency exam in September alongside new incoming students, or they can take other official English language exams. Students are not permitted to begin their EMI departmental courses until they submit an official result document or successfully pass the proficiency exam. This makes sure that students have a foundation in English language skills before starting their EMI courses. All in all, the proficiency examination has a central role in the academic journey of students in EMI programs.

3.3 Participants of the study

At the university level, researchers have categorized academic subjects in various ways (Altay, Curle, Yuksel & Soruç, 2022; Arnó-Macià & Aguilar, 2018; Becher, 1994; Macaro, 2022; Neumann, 2001; Roothooft, 2019). Mainly, academic disciplines are usually categorized into hard or soft disciplines. Overall, Neumann (2001) distinguished academic disciplines in a more detailed way as hard applied (e.g., engineering), hard pure (e.g., physics) or soft applied (e.g., education, business), soft pure (e.g., history etc.) subjects based on the content, nature of teaching, curriculum, assessment and teaching approaches. Similarly, Macaro (2022) classified EMI disciplines as hard-core and soft-core EMI. Engineering and Science disciplines such as Physics or Math are within the hard-core whereas disciplines like Business, Linguistics and Literature are named soft-core. Hard-core disciplines test theories based on data, but soft-core disciplines interpret tested data (Muller, 2007). Additionally, Roothooft (2019) modelled disciplines as STEM (Science, Technology, Engineering, Math) and humanities, focusing on the teaching style and language use. Finally, on the integration of ESP courses, a distinction was made on Engineering or Science degrees vs. Humanities and Social sciences by Arnó-Macià & Aguilar (2018).

In this study, purposive sampling was utilized to select EMI courses that provide rich and informative data for observation and subsequent focused interviews (Patton, 2002) and a distinction was not made while selecting the EMI courses. Within this purposive sampling, departments with significant student enrollment were taken into consideration for observation and focus group interviews. Computer Engineering, Civil Engineering and Mechanical Engineering departments from the Faculty of Engineering were chosen. Additionally, Physics and Chemistry

departments from the Faculty of Basic Sciences were observed. Finally, the Business Administration program from the Faculty of Business Administration was included in the research. Departments from the Faculty of Engineering and Basic Sciences are fully EMI departments whereas Business Administration is partially EMI. To explain, according to researchers (Arnó-Macià & Aguilar, 2018; Macaro, 2022; Neumann, 2001; Roothooft, 2019) departments from the Faculty of Engineering can be categorized as STEM, hard applied, hard-core and engineering or science. Also, Physics and Chemistry departments from the Faculty of Basic Sciences can be categorized as STEM, hard-core and engineering or science but hard pure. On the other hand, the Business Administration program from the Faculty of Business Administration can be categorized as soft applied, soft-core, humanities or social sciences.

There were both compulsory and elective courses among the observed EMI courses. In compulsory courses, there were more students compared to elective courses. For example, a Physics elective course had only six registered students, whereas a compulsory Computer Engineering course had 82 registered students.

In addition to EMI students participating in this study, EMI instructors from these departments were involved in the study through interviews on the types of scaffoldings they employ and their effect on interaction. In total, observations were conducted in the classes of two professors, three associate professors, and one assistant professor. Subsequently, interviews were conducted with these instructors regarding scaffolding and interaction in their classes.

There are two reasons for including these departments in the research. Firstly, the availability of volunteer instructors and recommendations from department heads was one of the reasons for selecting the departmental courses. Secondly, these

departments are usually delivered in English at various Turkish technical state universities. It would be easier to compare the results of these departments with other institutions in Türkiye and other countries. Finally, these departments had both elective and compulsory EMI courses. Overall, these factors were important while deciding on the observation plan.

3.4 Research design

The study conducted at Gebze Technical University comprises two main components: investigating the scaffolding practices of EMI instructors and examining the effect of these scaffolding practices on classroom interaction between EMI instructors and students. Given that these two research focuses are central to the study, it would be more appropriate to employ a mixed-method and multiple methods approach (Kuckartz & Rädiker, 2021) to gain a comprehensive understanding of the discussed concepts (Dörnyei, 2007). Therefore, both quantitative and qualitative data collection methods are utilized while conducting this study. Using both quantitative and qualitative data collection methods constitute a mixed-method approach, while employing focus groups and interviews represents a combination of multiple methods. According to Plano Clark and Creswell (2018), this research design can also be referred to as an explanatory design since it involves administering a questionnaire to EMI students, and then a focus group interview was conducted with some selected students.

3.5 Research instruments

The main research instrument employed in this study is observation of the EMI courses. EMI courses were observed with two cameras, one in front and the other

one was situated at the back of the class as suggested in the literature (Walsh, 2011). Recording the observed classes visually was important to understand the scaffoldings taking place and responses of the students to the scaffoldings. The second instrument was a questionnaire administered to the EMI students whose courses were observed. The third instrument consisted of a focus group interview conducted with some voluntary students after they completed the questionnaire. Final instrument was interviews conducted with the EMI instructors whose courses were observed.

3.6 Data collection procedure

After obtaining ethical permission to conduct research in EMI classes at Gebze University from the Gebze University Human Research Ethics Committee, I began by visiting the offices of the department heads to inform them about the aim of the research. Some department heads advised me to visit some EMI instructors and seek permission to observe their classes. For other departments, I chose to visit instructors' offices and inquire whether they would be willing to participate in my research. After that, the observation weeks and dates were coordinated taking into account the schedules of midterms and quizzes. The EMI courses were observed three or four times per semester, depending on the number of hours per week for each course. To facilitate the analysis of classroom observations, a "focused observation" approach was adopted, which zoomed in on scaffolding practices and interaction exclusively (Walsh, 2011). Some of the observations were recorded before and some were recorded after midterm weeks.

On the observation days, two cameras were located in the classroom. One camera was at the front near the EMI instructor while the other was at the back of the classroom to capture the interactions between students and the instructor. Before the

observation, a brief explanation was made regarding the purpose of the study and the ethical considerations. Students were informed that the recorded videos would not be shared with any other person including their instructors and the recordings would be used for research purposes only. Finally, an email was given to the students, and they were invited to the researcher's office for further inquiries.

The next step was to administer the questionnaire on students regarding scaffolding and interaction. After the final observation, a questionnaire was administered to the students on the final observation week. The questionnaire was provided though a QR code and most of the students were willing to complete the questionnaire. The last section of the questionnaire asked students whether they would like to participate in the focus groups with a friend in their classes. With students interested in participating in the focus groups, a date was planned to conduct the sessions online to eliminate the need for students to come to the university campus for the interview. Conducting the interviews online enabled greater participation in the focus group interviews.

During the focus group interviews, two students from the same discipline participated in each session. In total, six focus group interviews were conducted, one from each department observed. These sessions were programmed for different times of the day, including evenings and weekends, based on the availability of the students. Also, individual interviews with each EMI instructor were conducted after the focus interviews. Six EMI instructors participated, one from each EMI department observed. These sessions were scheduled based on the availability of the EMI instructor.

3.7 Student questionnaires

Due to the absence of established questionnaires addressing students' perspectives on the role of interaction in EMI contexts, survey items were formulated (An & Thomas, 2021). This process involved a thorough examination of literature and the adaptation of items from validated questionnaires that related to the subject of interaction. The questionnaire items were taken from the established questionnaire created by An and Thomas (2021), and the Student Course Engagement Questionnaire (SCEQ; Handelsman et al., 2005). While reviewing the questions from the Student Course Engagement Questionnaire (SCEQ; Handelsman et al., 2005), the factor analysis conducted by Brown, Bowmar, White and Power (2017) was taken into consideration. Only the items from the SCEQ that had participation loadings conducted after the factor analysis were included in the questionnaire.

3.7.1 Piloting

Before administering the questionnaire to the EMI courses during the final observation week, a pilot test was conducted with students whose courses were not observed. The piloting process consisted of three administration of pilot questionnaire. The first piloting test was administered to 56 students. The reliability test result showed that Cronbach's Alpha was .817, indicating good internal consistency but factor analysis showed inconsistency among items. Based on these findings, verbal adjustments were implemented based on the results of reliability tests and component matrix for factor analysis. After some questions were modified, piloting was conducted for the second time with other 73 students whose courses were not observed. The results of the second piloting demonstrated a good internal consistency with a Cronbach's Alpha of .877. However, further adjustments were

made to ensure that questions align with factors. Additionally, five questions were deleted as the extraction and rotation methods showed that these questions aligned better with factors when deleted. Finally, a third piloting was conducted, and the factor analysis indicated alignment with the factors of the items.

3.7.2 Administration

On the last week of the observation, before students were provided with questionnaire, they were informed about the content and the purpose of the questionnaire, and then students were provided with a questionnaire link via a QR code. In the questionnaire, students first filled in background information such as department and grade year. In the next section, students were provided with an explanation of scaffolding practices, describing them as methods that support learning and understanding. Following this explanation, students were asked whether they had observed their EMI instructors employing various supporting practices, such as asking questions, providing examples, and engaging students in class discussions. The subsequent section consisted of fifteen questions related to scaffolding practices and classroom interaction. The questions were rated on a 5-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree. In total 155 students filled in the questionnaire.

3.8 Focus group interview

In the focus group interview, there were eight questions on scaffolding and interaction. For the focus group interview questions, An and Thomas' (2021) research on EMI students' beliefs on EMI classroom interaction served as a guiding model. However, these questions were modified to elicit explanatory responses from

EMI students regarding their perceptions of interaction (Stewart & Shamdasani, 2014). In the first question, an introductory open-ended question was used to introduce the topic. The second question acted as a transition question by asking participants to rate classroom interaction on a scale of 1 to 5 and explain why they rated so. Followingly, six key questions were asked on various aspects of interaction such as factors that increase student-teacher interaction and barriers to participation in class. Finally, an ending question was used to complete the discussion by asking participants what changes they would make to improve interaction in classes. It was an "the all the things considered question" (Krueger, 2014) which aimed to gather overall reflections and suggestions from the participants. Overall, this structured approach during the focus group interview provided a solid framework for investigating the classroom interaction.

3.8.1 Administration

The language of the student questionnaire was in Turkish. This helped students to easily comprehend the questions and respond more comfortably. Before the beginning of the focus group interview, an explanation was made to the students regarding the purpose of the focus group interview. They were told that their opinions were valued and they were encouraged to share their thoughts in detail. Students were encouraged to comment on each other's opinions during the focus group interviews to turn these discussions into interactive conversations, which was one of the main objectives of these focus group interviews. This approach contributed to the discussions by letting students hear different perspectives. Additionally, interview questions were paraphrased and accompanied by examples to ensure that students fully understood the questions and could provide insightful

responses. To focus on the flow of the discussions without the need for extensive notetaking, these focus group interviews were audio recorded. The focus group interviews lasted approximately 25 to 30 minutes each, and the conversations were transcribed using free transcription programs.

3.9 Interview with instructors

The questions used in the focus group interviews were adapted for the interviews with instructors. Some modifications were made to tailor the questions to the EMI instructors. For example, question number five asked students their own factors that can hinder their interaction in the class. However, this question was changed to "Can you give examples of the support techniques you use to facilitate student interaction and understanding during class?". Also, some subcategory questions were added subsequently to dig into details such as "How do you engage your students in your class? What kind of strategies do you employ? What are the commonly observed types of interaction in your classes? (Question-answer, in-class group work, whole-class discussion, feedback). Similar adjustments were made to question six, with additional probing questions used to gather more detailed responses. "How do support techniques during class affect student participation based on your experience?" was asked as the main question; but additional questions were also used to ask to get more details when there is limited response to the main question. These adjustments ensured that the interview questions were appropriate for the context of discussions with EMI instructors.

3.9.1 Administration

The interviews with the EMI instructors were conducted after observing their courses, which facilitated the researcher's access to them. Before the focus group interviews, the purpose of the interviews was explained to the instructors. The interviews were conducted individually in the instructor's office at the scheduled time and date. The language of the interview with the EMI instructors was in Turkish. This medium of language has led to a more comfortable and relaxing setting for EMI instructors, which has enabled them to provide more comprehensive comments. The questions in the questionnaire served as the starting point, providing a reference for the interview. Furthermore, follow-up questions were formulated based on the responses of the EMI instructors to explore the topics more intensely. Audio recording of the interviews with the EMI instructors allowed the researcher to focus on the conversation and later remember all the discussed details accurately. The interviews with the EMI instructors lasted approximately 15 to 30 minutes each, and the discussions were transcribed using several free transcription programs. At the end of the interview, some EMI instructors expressed interest in receiving feedback about their observed courses. A meeting would be arranged after the completion of the research to provide them with feedback.

3.10 Ethical issues

Before starting this study, it was important to choose the research context as availability of the participants is an important issue while conducting research. Therefore, I wanted to work on the university context, where I have been working currently for last five years. This helped me talk to the vice rector first, explaining my purpose of the study, which was not to judge the EMI instructors, but to observe

the current situation in EMI context in a technical university. Furthermore, it was emphasized that EMI instructors would have the autonomy to decide whether or not to participate in the research.

After the initial contact with the vice rector, a proposal was submitted to the Human Research Ethics Committee at Gebze Technical University for ethical approval. This proposal, focusing on studying EMI classroom discourse, was approved by the Committee four weeks after its submission. While contacting the EMI instructors for the research, they were informed about the approval granted by the Human Research Ethics Committee. EMI instructors were also informed that the recordings of their classes and any insider information regarding their classes would not be shared with other individuals, including the rectorship and the recordings would be deleted after the completion of the research.

As for the EMI students, on the first day of observation, they were initially presented with the Human Research Ethics Committee research approval and information related to the research and its purpose through a Word document in Turkish, which was projected onto a screen. Later, students were asked to fill out consent forms, which were explained and displayed during the session. Also, In the consent form, an explanation was made regarding their images if used for the research. They were also informed that these video recordings would not be shared with any other individuals, including their EMI instructors. Additionally, students were informed that they could visit the researcher's office on campus or email the researcher for further information.

3.11. Data analysis

3.11.1 Video recordings

There are four types of data for this study. The first one is the video recordings of the EMI courses. For the video recordings of the observed EMI courses, discourse analysis (Sinclair & Coulthard, 1975) has been selected as the main research methodology to analyze the scaffolding practices of the EMI instructors in their EMI courses and their impact on classroom interaction since scaffolding practices are grouped based on preset categories. To analyze scaffolding practices using discourse analysis methodology, a new framework was developed based on scaffolding items from Wood et al. (1976), Walqui (2006), and Van de Pol et al. (2010). These scaffolding items were coded according to their potential purposes, which were categorized as follows: warm-up to the topic (1), transition to the main topic (2), aiding student comprehension (3), assessment (4), and guiding students (5). Consequently, five categories were used to analyze the scaffolding purposes of EMI instructors.

For example, when an EMI instructor used real-world examples or engaging questions at the beginning of the lesson, this was categorized as “Contextualizing” by Walqui (2006) under the warm-up category. The second category was applied when EMI instructors demonstrated an activity or explained a task step-by-step after the warm-up session, such as using “Demonstration” by Wood et al. (1976) or “Modeling” by Walqui (2006). The third category focused on helping students comprehend the main topic, including practices like “Schema Building” by Walqui (2006) and “Giving of Hints” by Van de Pol et al. (2010). In this category, a comparison was made between scaffolding practices that amplified content, such as

graphic organizers and those that simplified content, such as reducing the complexity of information to match the student's level.

In this way, scaffoldings were checked whether they served to simplify or amplify the content for students. To simplify, instructors can employ strategies such as "Recruitment," "Reduction in degrees of freedom," "Direction maintenance," "Marking critical features," "Frustration control," and "Demonstration" (Wood et al., 1976). For instance, "Recruitment" involves capturing students' attention to the content, and "Reduction in degrees of freedom" lowers the difficulty level to provide more manageable information.

To amplify, instructors can utilize “Modelling”, “Bridging”, “Contextualizing”, “Schema building”, “Representing text”, “Developing meta-cognition” (Walqui, 2006). To illustrate, when instructors use “Modelling” as a scaffold, they can demonstrate the correct method of completing activities while using the target language efficiently. Also, “Bridging” scaffolds can be used to teach new concepts by activating previous concepts so that students can establish connections between new information and old information.

The fourth category involved assessing students' comprehension through “Questioning” and “Feedback.” The final category centered on guiding students during lectures. For instance, when an EMI instructor highlighted important concepts or posed open-ended, thought-provoking questions, it was categorized as guidance or metacognitive support.

Additionally, for data analysis of the scaffolding practices, Van de Pol et al. (2010)’s scaffolding intentions and scaffolding means were utilized. Accordingly, “Direction maintenance”, “Cognitive structuring”, “Reduction of the degrees of freedom”, “Recruitment” and “Contingency management / frustration control” are

used to explain the intentions of a scaffolding. On the other hand, “Feeding back”, “The giving of hints”, “Instructing”, “Explaining”, “Modeling”, and “Questioning” are named as the means of scaffolding strategies. The details related to the purposes and means of scaffoldings were also explained by Van de Pol et al. (2010).

The final step of data analysis was on the types of scaffoldings: Cognitive scaffolds, Metacognitive scaffolds, and Affective scaffolds. For example, Modelling, Questioning, Feedback and Using Prompts are categorized as cognitive scaffolds, which can help students understand the concepts better. On the other hand, Recruitment, Contingency Management/Frustration Control are in affective category, and metacognitive scaffoldings include Metacognition scaffolds such as goal setting, planning, monitoring and reflective thinking.

After categorizing scaffolding practices according to their purposes and types, these categories were integrated into the coding framework. For example, “Bridging” and “Contextualizing” in the warm-up category were grouped as conceptual scaffolds, while “Recruitment” was categorized as affective scaffolding. I named the resulting framework as “Integrated Scaffolding Practices Frame.”, and this new framework was used to code scaffolding practices during discourse analysis of the recordings. However, the new framework and its items in the categories were refined through the discourse analysis of the recordings, and new items which appeared in the EMI lectures were added to the framework. Such refinement during the discourse analysis helped the framework become more comprehensive and data based. The first draft and the final draft of the “Integrated Scaffolding Practices Frame” are included in the Appendix B and Appendix C.

The analysis of the student engagement was measured based on the student responses. The study focused on the number of turns in a conversation following the

delivery of a scaffolding by the EMI instructor. This analysis was guided by the concept that the number of turns in a conversation can serve as an indicator of interaction (Hall, 2011). The analysis utilized the Initiation-Reply-Evaluation (IRF) framework (Sinclair & Coulthard, 1975; Sinclair, 1987), which categorizes conversational turns into three main parts: initiation, reply, and evaluation. Longer exchanges, such as I-R-F-R-F (Tang, 2021) or more complex patterns like I-R-I-R-I-R-I-R-I-R-I-R-F (Ismailov, 2022) have been shown to foster greater interaction between students and instructors. By examining the structure of conversational turns and identifying patterns of interaction, this analysis sought to understand how scaffoldings influenced the depth and extent of engagement between EMI students and their instructors (Macaro et al., 2016).

3.11.2 Student questionnaires

The second type of data collected for this study was a questionnaire on student perspectives on scaffolding and interaction. The data was analyzed using the SPSS program. First, descriptive analysis was performed to determine the means of the questionnaire items and the frequencies of the findings. Subsequently, a factor analysis of the questions was conducted using the SPSS program to identify the underlying factors. Additionally, a correlation analysis was conducted on the quantitative data to identify any significant correlations between the questions and the factors. Subsequently, to analyze the differences across different department, a one-way ANOVA analysis was carried out. Besides, a post-hoc Tukey analysis was performed to identify significant differences between pairs of departments.

3.11.3 Focus group interviews and teacher interviews

The third type of data collected for this study consists of focus group interviews with EMI students regarding scaffolding and interaction while the fourth type involves interviews with EMI instructors on the same topic. Before starting the analysis of the responses to the interview question, a qualitative descriptive thematic analysis was employed to analyze the codes and form themes (Braun & Clarke, 2008). In this approach first I focused on identifying codes and then forming themes from these codes. Subsequently, patterns and themes were interpreted. In thematic analysis, inductive coding is usually employed, so codes were created directly from the data through the process of descriptive thematic analysis.

After the interviews were conducted, firstly, audio recordings of the focus group interviews and teacher interviews were transcribed using a transcription program. Subsequently, the transcription files underwent a thorough accuracy check, and any inaccuracies were corrected manually. To initiate quantitative analysis, responses from participants were compiled and organized into separate notes. To illustrate, the responses of the participants to the first question in the interviews was documented on a different Microsoft Word page, and then the same procedure continued for the other questions. This has facilitated the subsequent analysis.

While analyzing the responses to the interviews, the methods written in “The Coding Manual for Quantitative Researchers” by Johnny Saldaña (2009) served as the primary reference. Initially, the responses to the interview questions were reviewed thoroughly, and related parts were coded with the same highlighters on a Microsoft Word page. An inductive coding approach was employed to ensure that the opinions of the participants in the study were accurately documented (Saldaña, 2009). Therefore, the codes created closely reflected the original data.

According to the book by Saldaña (2009), two circles of analysis were advised when coding the qualitative data. Consequently, for this study, descriptive coding was applied during the first cycle of coding, which aimed to label data on related statements. After that, for the second cycle of coding, pattern coding was adopted to identify recurrent patterns among the labeled codes created during the first circle of coding (Auerbach & Silverstein, 2003). Identifying the patterns process was first introduced to four thesis advisor professors and then samples from the data were presented in thesis progress meetings. The thesis advisors commented on the identification process of patterns from the codes and provided feedback to refine patterns. This circle of feedback served as expert opinion before creating patterns for the remaining data. Following the recommendations of the thesis advisors, the patterns identified were categorized and turned into themes, which included all the subcategories and coded elements.

3.12 Validity and reliability of the study

To enhance the validity and reliability of this study, several measures have been implemented. Firstly, this study was designed to be both observational and explanatory. It included video recordings of the observed classes and utilizing both quantitative and qualitative data analysis techniques. Video recordings of the classes have enhanced the validity of the data. The combination of visual and verbal data enabled the researcher to conduct a more in-depth analysis. In addition, the study employed a questionnaire to gather students' views as quantitative data and conducted a focus group interview with students along with semi-structured interviews with EMI instructors to gather qualitative data. Such a research design has facilitated the triangulation of data.

After the research design was planned, ethical approval was obtained from the university where the study was conducted. To capture a comprehensive view of classroom interaction, two cameras were utilized during classroom observations. The total duration of recordings for the observed classes amounted to 29 hours and 7 minutes. Moreover, recordings were made across various departmental courses to ensure the generalizability of the findings. As another step, piloting was conducted for the questionnaire to check the clarity and relevance of the questions. Finally, the focus group interviews and interviews with the EMI instructors were audio-recorded to ensure that no details were missed during the interviews.

CHAPTER 4

FINDINGS AND ANALYSIS

This chapter will present the results of the four research instruments employed in this study. Three data collection instruments are questionnaires from EMI students, focus group interviews with EMI students, interviews with EMI instructors and video recordings of the EMI courses.

4.1 Findings of student questionnaires

On the final week of the observational sessions, a questionnaire on scaffolding and classroom interaction was administered to the EMI students enrolled in the corresponding course. A total of 155 students completed the questionnaire online through Google Forms. The questionnaire consisted of fifteen questions following background information and a preparatory question. In the background information part, students filled in their department name and grade. The preparatory question asked students whether they had noticed scaffolding techniques during their EMI courses. A 5-point Likert scale was used to rate questions related to scaffolding and interaction.

4.1.1 Descriptive analysis

In the section on background information, out of the 155 students surveyed, 31.6% were students from Computer Engineering department, 23.2% were Business Administration students, 18.7% were Civil Engineering students and 16.8% were Mechanical Engineering students. Additionally, 40.6% were junior students (grade

three), 32.3% were sophomore students (grade two) and 27.1% were senior students (grade four).

Regarding the preparatory question, 90.3% of the EMI students reported to have noticed in-class supporting techniques from their EMI instructors. The purpose of the this question was to find out if EMI students thought their teachers helped them during the lectures. This finding shows that 90.3% appreciated the scaffolding support provided by their instructors in general without seeing the detailed questions on scaffolding and interaction.

In the main section of the questionnaire, there are fifteen questions on four different factors. The first four questions were based on scaffolding effect on interaction and student talk. Questions five, six and seven were related to students' opinions on interactive class setting. Questions from eight to 13 asked students' opinions on self-participation. Question 14 and 15 were about the importance of in-class interaction and teacher questions.

The first item factor was examined in the first four questions. In the first question of the main section of the questionnaire, students were asked to rate the question on whether the use of different scaffolding techniques by their teachers contribute to the creation of a more interactive classroom environment. 34.2% of the students strongly agreed, 56.8% agreed, and 8.4% had no idea, which shows that 91% of the students were positive about scaffolding practices of their instructors and their effect on interaction. 91% agreement indicates that EMI students are aware of the importance of in-class scaffolding to promote student engagement, and they value an interactive classroom atmosphere.

The second question similarly addressed scaffolding practices and classroom interaction but from a more student-centered perspective. It asked students to rate the

extent to which they believe their teacher's scaffolding practices contribute to fostering students' participation in classroom discussions. This question elicited a similar response to the first one. 85.8% of the student agreed. 10.3% of them expressed uncertainty and 3.9% disagreed. Again overall, the majority of the participating students believed that scaffolding practices were effective in promoting participation in EMI courses.

Likewise, the third question also focused on scaffolding practices and their effect on interaction in terms of active participation. It rated how much the participating students agreed with the statement: “I think that the scaffolding practices used by our teacher increase students' active participation.” The findings show that while 80% of the students agreed with the statement, 12.9% had no idea and 7.1% disagreed. Students seem to value scaffolding practices to enhance active participation. However, the percentage of unsure and disagreed students has increased to 20% since the first question. This percentage was 9% in the first question and 14% in the second, which might demonstrate that asking similar questions in a questionnaire can be beneficial in understanding student perspectives and identifying areas to improve for researchers and instructors.

Question four also focused on the impact of scaffolding techniques on classroom discourse. However, the part concerning participation in the previous question was modified to talking about the topic to make it more specific but also related. It asked students to rate the statement: “The scaffolding techniques used by our teacher enable students to talk more about the topic in class.” The findings show that 76.2% of the students agreed with the impact of scaffoldings. 19.4% were unsure and 4.5% disagreed. The percentage of students who were unsure or disagreed, totaling 23.9%, suggests that not all students may be aware of scaffolding practices.

To determine whether there is coherence among responses to questions with similar themes after factor analysis (Colosi, 2006), similar questions were administered consecutively to assess the consistency of responses (Sheatsley, 1983). While the percentage of students who were unsure or disagreed increased gradually from the first to the fourth question, the majority of students agreed that the scaffolding practices of their EMI instructors enhanced their in-class participation, and there is a consistency among the four questions on scaffolding effect on in-class interaction.

The second item factor was surveyed in questions five, six and seven which aimed to get the opinions of the EMI students on elements of an interactive class. Question five asked students to rate how much the participating students agreed with the statement “During the class, only our teacher should engage in in-class discussions”. Although 63.8% of the students do not favor traditional teaching style, 21.9% agree that their EMI courses should be teacher centered. Additionally, 14.2% of the students were unsure about their viewpoint on this matter, which amounts to 36.1%.

In the same category, Question six asked students to rate “For me, it's more important that the teacher explains and covers the topic alone in class, rather than having interactive teacher-student sessions”. 65,2% of the students wanted to have an interactive lesson. Also 11.6% were unsure. These results suggest that most of the students (65.2% in total) have a positive inclination towards having interactive classroom atmosphere, indicating a potential need for EMI courses to be more engaging and promote active participation.

Question seven, which also focused on interactive class settings, asked students to rate the statement "In classes, students should prefer giving short answers

to questions rather than long answers related to the topic." This question specifically addresses the type of interaction in the classroom. The findings reveal that 11.6% of the students strongly agree and 38.7% agree that short answers, such as yes-no answers, are appropriate and more commonly used in EMI courses. Apparently, half of the students who participated in the questionnaire (50.3%) may perceive interaction as equal to providing short responses to the teacher's questions. On the other hand, 26.5% disagree and 3.2% strongly disagree that short answers are favorable in their EMI courses. The remaining 20% remain uncertain on this issue. These results suggest that students have differing opinions among students with respect to short answers to questions. EMI instructors should take these contradictory opinions while designing their courses since some students may benefit from short answers whereas others favor providing long answers to teacher questions.

The third item factor was based on self-participation. Questions from eight to 13 focused on the opinions of the students regarding self-participation. In Question eight, students rated how much they agree with the statement “I actively participate in class discussions”. This item in the questionnaire aimed to assess how students perceive their level of active participation in their EMI courses. The findings revealed that less than fifty percent of the students (42.1%) actively participate in class discussions. Conversely, 3.9% strongly disagree and 32.3% disagree with this statement, while 21.3% were unsure about their level of activity in their EMI courses. This suggests that only 42.6% of the participating students favor active participation in their courses. In this case, it seems that majority of the students are not willing to participate although 76,2% of believe that in-class scaffoldings lead students to talk more in class (question four). This indicates that there is a discrepancy between EMI students’ beliefs and their actual participation, which

suggests that there might be some other factors influencing their level of engagement in their courses.

Question nine also addressed the factor of self-participation. Students were asked to rate the statement “I raise my hand to participate in class”. The findings for this item indicate that 9% of the students strongly agree and 46.5% agree that they raise their hands to participate. Conversely, 5.2% strongly disagree, 23.2% disagree, and 16.1% are unsure about raising their hands. This suggests that while a considerable number of students are willing to participate by raising their hands, there might also be a need for additional support and encouragement to foster a more inclusive learning atmosphere. On the other hand, in question 8, fewer students (42.5%) expressed their willingness to participate, while question 9 shows that more students (55.5%) would like to raise their hand in class. This could indeed stem from how students perceive active participation. For students, there might be difference between active participation and simply raising their hands because students in question 7 expressed a preference for giving brief answers over long ones in EMI courses. Obviously, EMI students prefer raising hands and giving brief answers rather than engaging in lengthy explanations.

Question 10 examined self-participation of the students further and students' willingness to answer questions during their EMI courses were explored to determine the consistency between question nine and 10. According to findings, question 10 received a similar response from the students. Nearly 55.5% of students raise their hands in response to class questions, but only 20.6% disagree or strongly disagree. These figures demonstrate that students are willing to participate, but it is worth noting that 20% of students are still unsure about responding questions, which may indicate a lack of confidence in participation.

In Question 11, students' willingness to ask questions when they encountered difficulties in class were assessed. 69.1% of the students were willing to ask more questions when they do not understand the content. Also, compared to other questions regarding self-participation, more students were willing to ask questions in case of a challenge. Students who are unsure about asking questions decreased to 10.3% when they do not understand the topic. This situation suggests that EMI students can be more proactive and take initiative to ask questions especially when they encounter a difficulty in understanding the topic.

Next question addressed the participation factor from a different perspective as the question 12 asked students to rate “I prefer our teacher to ask us questions related to the subject during class”. Similar responses were given by the students when they ask questions and when the instructors ask them questions. 66.5% of the students favored their teachers to ask them questions, while the percentage of strongly disagreed and disagreed students amount to only 15.7%. Therefore, researchers can infer that more students value their teacher’s questions and feel they are important for their learning.

The final item factor based on factor analysis is related to interaction and questioning. The findings to the question 13 asked students to rate the importance of sharing ideas or information related to the subject during class, and it had a high rate of agreement at 87.1%. This indicates that most of the EMI students value the opportunity to engage in their courses by expressing their ideas during class discussions. It further explains the importance of encouraging student participation and interaction in EMI courses, both through student-initiated questions and instructor-led discussions.

The next question in the questionnaire asked students to rate "Interaction between the instructor and students is important for classes" to get an overall assessment of interaction in class. Overall, 91% of the students responded positively to this question, indicating that interaction is considered to be important and appreciated by the majority of students in EMI courses.

The final question asked students to rate their preference for instructors asking more questions to encourage students to share their thoughts on the subject during class. Among the participating students, 70.3% agreed or strongly agreed to this idea. These results indicate that EMI students value instructors who actively involve them in class discussions and promote participation.

After the analysis of the overall findings of the questionnaire items, means of the questionnaire items across departments can be seen in Appendix E.

For Q1, the highest mean belongs to physics students (M=4.50). Business students on the other hand, had the lowest mean (M=4.17). For Q2, physics students again had the highest mean (M=4.50), but computer engineering students had the lowest mean (M=3.88). For Q3, chemistry students had the highest mean (M=4.40), and physics students had the lowest mean (M=3.50). For Q4, civil engineering students had the highest mean (M=4.13), while physics students had the lowest mean (M=3.50). For Q5, chemistry students had the highest mean (M=3.10), but physics students had the lowest mean (M=1.50). Similarly, for Q6, chemistry students had the highest mean (M=3.20), and physics students had the lowest mean (M=1.50). For Q7, physics students had the highest mean (M=3.50), whereas civil engineering students had the lowest mean (M=1.50). For Q8, physics students had the highest mean (M=4.50), and mechanical engineering students had the lowest mean (M=2.85). For Q9, physics students had the highest mean (M=4.50), while computer

engineering students had the lowest mean (M=1.50). For Q10, physics students had the highest mean (M=4.00), while computer engineering students had the lowest mean (M=2.96). For Q11, physics students had the highest mean (M=5.00), whereas computer engineering students had the lowest mean (M=3.14). For Q12, physics students had the highest mean (M=4.50), while mechanical engineering students had the lowest mean (M=3.37). For Q13, chemistry students had the highest mean (M=4.40), while physics students had the lowest mean (M=3.00). For Q14, chemistry students had the highest mean (M=4.50), whereas physics students had the lowest mean (M=3.50). Lastly, for Q15, business students had the highest mean (M=3.92) and physics students had the lowest mean (M=3.00).

In summary, the data from the questionnaire indicates that physics and chemistry students generally hold positive feelings towards their EMI courses. However, engineering and business students seem to have negative attitudes toward their EMI courses.

4.1.2 Results of factor analysis, correlation test and one-way ANOVA

After the descriptive results of questionnaires, a factor analysis of the questions was conducted using the SPSS program. Four factors were identified in the questionnaire, which was consistent with the pilot studies conducted prior the main study. The first factor encompasses the first four questions. The second factor includes questions five, six and seven. The third factor comprises questions eight, nine, 10, 11, 12. Finally, the last factor includes questions 13, 14 and 15. In summary, the results of the factor analysis showed in the main study validated the findings of the pilot study.

In addition to factor analysis, a correlation analysis was conducted on the quantitative data. The results indicated similar correlations between the questions

and the same factor, which showed that similar questions in the factor analysis correlated significantly with each other. To illustrate, Q5 and Q6 from the second factor correlated significantly with a coefficient of .727. Similarly, Q2 and Q3 from the first factor in the questionnaire showed a significant correlation with a coefficient of .750.

Moreover, a one-way ANOVA analysis was conducted to check any significant differences between the means of questionnaire items across different departments. According to the analysis, Q6, Q8, Q10 and Q11 had significantly different means across different departments. To identify which departments had significant differences, a post-hoc Tukey analysis was performed. Additionally, independent-samples t-test were utilized to compare pair means and identify significant differences between two departments.

For Q6, which is "For me, it is more important for the teacher to only explain the topic and work alone in class than for the lesson to be interactive between the teacher and the students.", significant differences ($p < 0.05$) were found between mechanical engineering students (M=2.19) and chemistry students (M=3.20). Similarly, mechanical engineering students (M=2.19) differed significantly ($p < 0.05$) from business students (M=2.89). Also, computer engineering students (M=2.27) showed significant differences ($p < 0.05$) from both chemistry students (M=3.20) and business students (M=2.89).

For Q8, which is "I actively participate in class.", chemistry students (M=3.90) differed significantly ($p < 0.05$) from both computer engineering students (M=2.90) and mechanical engineering students (M=2.85). Besides, for Q10, which is "I answer questions in class.", chemistry students (M=3.90) differed significantly from both computer engineering students ($p < 0.01$, M=2.96) and mechanical

engineering students ($p < 0.05$, M=3.07). For Q8, there was also a significant difference ($p < 0.01$) between computer engineering students (M=2.96) and business students (M=3.67).

Lastly, for Q11, which is “When I don't understand something in class, I ask questions.”, computer engineering students (M=3.14) differed significantly ($p < 0.01$) from business students (M=3.89). There was also a significant difference ($p < 0.05$) between computer engineering students (M=3.14) and physics students (M=5.00).

In addition to comparing means of the questionnaire items across departments, a one-way ANOVA analysis was conducted to determine if there were any significant differences across different grades. Sophomore, junior and senior EMI students participated in the questionnaire. The results of the one-way ANOVA analysis showed that there is no significant difference among questionnaire items across grades. There are a few exceptions. For Q14, which is “Interaction between the teacher and student is important for students.”, there is a significant difference ($p < 0.05$) between sophomore (M=4.36) and junior students (M=4.10). Additionally, Q5, which is “Only our teacher should engage in in-class discussions during the lesson.”, differed significantly ($p < 0.05$) between junior (M=2.68) and senior students (M=2.21).

In the last section, a one-way ANOVA analysis was conducted to determine if there were any significant differences between two states of awareness of in-class scaffoldings. Out of 155 students, 140 students were aware of the scaffoldings employed in the class, whereas 15 students did not notice any scaffolding practices in their EMI classes. Since Levene’s Test for Equality of Variances indicated that variances were not equal, the significant values were handled carefully to ensure

accurate interpretation of the results. Accordingly, there was a significant difference between EMI students who notice a scaffolding practice and the ones who did not notice a scaffolding practice with respect to Q2, Q3 and Q4. For Q2, which is “I believe that our teacher's scaffolding practices contribute to students' discussions about the lesson.”, there was a significant difference ($p < 0.01$) between two groups (M=4.14, M=3.27 respectively). Similarly, Q3, which is “I think that the scaffolding practices used by our teacher increase students' active participation.”, there was a significant difference ($p < 0.05$) between two groups (M=4.04, M=3.40 respectively). Finally, Q4, which is “The scaffolding techniques used by our teacher enable students to talk more about the subject in class.”, there was a significant difference ($p < 0.05$) between two groups (M=4.01, M=3.33 respectively).

4.2 Findings of focus group interviews

Focus group interviews were conducted with students from each department observed, so there were a total of six focus group sessions. To ensure effective discussion, only two students were invited to participate in each focus group, following recommendations from research methodologies in the literature (An & Thomas, 2021; Krueger, 1994). There were eight questions regarding scaffolding and classroom interaction (see Appendix F). Prior to the interviews, participants were informed that they could contribute to their peers' responses and offer alternative perspectives at any time during the discussion.

The interview questions were adapted from An and Thomas’ (2021) study, but different question types were employed based on recommendations from experts on focus group interviews (Hennink, 2014; Krueger, 2014; Stewart & Shamdasani, 2014). The structure included an introductory question to start the session. Then it

was followed by a transition question to move into the six main key questions. Finally, a comment question was asked to gather participants' closing remarks. For the analysis of the responses to the interview questions, a qualitative descriptive thematic analysis was employed to analyze the codes and form themes.

The first question was "When you hear the term teacher-student interaction, what is the first thing that comes to your mind?". When the student responses were analyzed based on thematic analysis, five themes were extracted from the data. The first theme is "engagement and participation" and the codes for this theme are asking questions in the class or outside, answering questions, participating in discussions and student contributions. One of the students: "When it comes to interaction, what comes to mind for me is the ability to ask questions or engage in discussions about the lesson. When I think of interaction, I think of being able to respond or contribute to what the instructor is saying at any moment, whether by answering a question or providing a comment." The second theme extracted is "communication and accessibility". The codes for this theme are syllabus with clear expectations and guidelines, accessibility of instructors, timely responses to student questions through various channels and responding to student questions in class. One of the students: "When any question is asked, some instructors, excluding a few, usually respond late or I don't get any response at all." The third theme is "teacher-student relationship". The codes for this theme are direct contact with students, recognizing student names, feeling valued and respected, sincerity, harmony between the instructor and students. One of the students: "What comes to my mind is the instructor directly talking to us while teaching, not just addressing the group but having a direct conversation with us individually." Another student: "The instructor showing interest to the students means something. Because when the instructor just... It's like there's only a wall... It's

like there's no one in front of them, as if it's an obligation to stand there... When they start talking, there's a disconnect between the student and the instructor." The fourth theme is "teaching approach" and the codes for this theme are random teacher questions, the use of a variety of tools in class, interactive presentations, and tailoring instruction for varying student levels. One of the instructors: "I think of the instructor being active. Not just sitting at the desk. Not just reading from the slides." Another student: "I think what makes a teacher a teacher is knowing the level of the students. Because there are students at every level. Some have a high level, some have a low level, some have a medium level, and the teacher needs to be able to adjust to the level of each student and provide interaction at that level. That's what comes to my mind. In fact, what makes a teacher a teacher is being able to engage with students at every level of interaction." Finally, the last theme is "guidance and motivation", and the codes for this theme are mentorship for academic performance, encouragement, support from instructors and collaboration. One of the students: "The first thing that comes to mind is the teacher supporting and motivating the student in the learning process. My first advisor comes to mind, that is, when I wanted to ask something like this for the first time. Like guidance." Overall, "engagement and participation", "communication and accessibility", "teacher-student relationship", "teaching approach", "guidance and motivation" themes seem to be key aspects when students think of student - instructor interaction at the beginning of the interview.

The second question in the focus group interview served as a transition, leading into the main key questions. It was phrased as follows: "How important is the interaction between instructor and student in the classroom for you? Could you rate it from 1 lowest to 5 highest? Why do you think so?". Following the analysis of the responses, the average rating was 3.83 out of 5. Some participants emphasized

the vital importance of interaction and rated it as five, while others disagreed, stating that interaction is not necessary for effective learning. One of the students: “Three for me. The reason. Interaction depends on the student as well. No matter how much teacher tries, if the students don’t want it, there is no point.” Another student: “For me, five but three points out of five belong to the teacher, and two points belong to me because I also need to take notes in class”. There are three themes emerged based on the responses. The first theme is “perception of interaction intensity”. The codes for this theme are optimal levels of interaction, feeling stressed when constantly engaged with the instructor, the occasional necessity of traditional lecturing, interaction may not suit all students, and some students may not enjoy the topic. One of the students: “If the teacher communicates with me too much in the class, I personally disconnect from the class. In other words, when interaction increases, I tend to disconnect more from the class. I prefer a more individualized lesson”. The second theme is “impact on learning”. The codes for this theme are support learning, understand better through interactive questions, speed up learning, ask questions, deep learning, social skill development. One of the students: “Indeed, asking questions and providing answers to each other enhances the other person's understanding.” Another student: “Exactly, engaging in classroom interactions facilitates learning. Asking questions and discussing the subject allow us to learn more comprehensively. Additionally, I believe that this improves our social skills. We can participate in discussions more easily”. The third theme is “individual learning”. The codes for this theme are reliance on self-study materials such as textbooks and notes, preference for individual learning and diminishing importance of interaction for university students. One of the students: “In classes, there are notes, textbooks actually. So, it's not very important to me to have so much interaction. I

mean, learning from books or notes instead of through this interaction can also be a solution. It would be good if it happens, but if it doesn't, I don't lose much." It seems that despite the overall high average importance rating of 3.83 for interaction, EMI students hold diverse perceptions regarding the level of interaction. While some recognize the significance of interaction in learning, others may prefer self-study approaches.

The third question in the focus group interview was one of the key questions and was framed as follows: "What do you think increases teacher-student interaction in the classroom?". Upon analysis of the responses, two main themes emerged contributing to increased interaction. The first theme is "positive qualities of the instructor". The codes for this theme are the rapport with students, the passion of teachers for their profession, their positive energy, being understanding and student-friendly, showing value to students, accessibility of instructors and avoiding belittling students. One of the students: "Liking the teacher. So, the teacher being understanding, student-friendly, and us being teacher-friendly enable that." Another student: "The teacher's enjoyment in what they do is indeed crucial, in my opinion. Both sides should have a positive and energetic approach. Additionally, the teacher being aware that those in front of them are not just students but individuals as well." The second theme for increasing interaction is "classroom techniques". The codes for this theme are asking questions, standing while teaching, explaining the logic behind abstract topics, adjusting teaching for students' level, not having a monotonous tone of voice, using gestures and mimics, not reading only from slides, providing feedback and giving satisfactory answers to questions. One of the students: "Gestures and facial expressions of our instructors rather than a monotonous tone of voice are effective to enhance interaction. Also, when lessons are delivered mostly through

PowerPoint slides, our attention diminishes." Utilizing whiteboard, varied vocal intonations and hand gestures can enhance engagement. Another student: “Focusing on learning needs, being able to reach our instructor whenever necessary, asking our questions freely, and receiving satisfying answers are all important.” These two themes seem to play a crucial role, emphasizing both the personal qualities of the instructor and the pedagogical approaches utilized in engaging students and fostering an interactive EMI classroom.

Question four in the focus group interview was another key question, framed as follows: “What do you think decreases teacher-student interaction in the classroom?”. Upon analysis of the responses, three main themes emerged as factors contributing to decreased interaction. The first main theme seen in the data is “course dynamics”. The codes for this theme are overcrowded classrooms, repetition of similar topics every term, long duration of courses at a time and lack of breaks. One of the students: “Large class sizes and crowded classrooms indeed pose challenges to engagement between students and instructors”. The second theme "teacher and student factors" includes codes such as teacher demeanor such as being tense or unapproachable, lack of engagement from the instructor, lack of motivation and self-confidence among students, not feeling valued by the instructor, student behaviors such as arriving late or not attending class and lack of English proficiency. One of the students: “For some instructors, who's listening, who's not, or what is the teacher delivering? It doesn't matter at all. He would just take the paper and read. This negatively affects.” The last theme that emerged from the data is “instructional approach”. The codes for this theme include passive use of slides without engagement, lack of eye contact with students, lecturing quickly to finish early, insufficient sources for the lesson, emphasis on irrelevant or excessive theory,

monotonous delivery of content, failure to connect course material to real-world applications, inability of teachers to adapt to students' varying levels, lack of focus on the purpose of the lesson and providing copy-paste answers to student questions. One of the students: “If the teacher just reads from the slides without any movement or interaction, it reduces the interaction with the teacher during the classes”. Another student: “When the teacher goes through too much unnecessary theory, students start to lose interest. If everyone knows the purpose or objective of the lesson from the beginning and avoids delving into theory unnecessarily, the interaction increases and becomes more understandable”. These themes with detailed codes offer valuable insights related to EMI student opinions on classroom interaction.

Question five in the focus group interview served as an additional probe to further explore and personalize the previous question, which was framed as: “What are the factors that hinder your interaction/participation in class?” Upon analyzing the responses, three key themes emerged. The first theme is "psychological barriers". Under this theme, the codes include feeling uncomfortable in class among peers, fear of negative reactions from both peers and instructors, apprehension about making mistakes and dislike for certain classmates or the instructor. One of the students: “The teacher should make it clear that even if students say something wrong or ask something silly, there won't be any negative consequences. If the teacher increases their sincerity a bit, they can eliminate factors that hinder participation in the class”. The second theme is "personal readiness", and the codes include being unprepared, lacking interest in the subject matter, not having necessary materials, uncertainty about the course's future applicability and a lack of clear course objectives. One of the students: “The lack of future benefits or awareness about the usefulness of the course, aimlessness and the absence of a future-oriented goal for the course affects

my participation”. Lastly, the theme of "environmental and external factors" emerged, with codes including early class hours, uninterrupted long sessions, overcrowded classrooms, excessive weekly topics, the workload from other courses and distractions from technological devices like phones and tablets. One of the students: “For me, the classes being very early in the morning, progressing in a block format without any breaks, and distractions from phones and iPads while trying to take notes. As we introduce more technology, our attention tends to scatter”. These factors highlight influencing students’ participation negatively in EMI courses.

Question six in the focus group interview was also a key question for the research, and it goes as: “What effective strategies could teachers implement to promote interaction in the classroom? How do these strategies impact the lesson?” Upon analysis of the responses, three key themes emerged. The first comprehensive theme is “instructional pedagogy”. Under this theme, the codes include varied presentation techniques, group activities, utilization of visual and auditory aids, incorporation of different question types, random questioning, use of warm-up introductions, real-life examples, humor, storytelling, integration of out-of-lesson elements, and fostering interactive discussion settings. One of the students: “Instructors could change the presentation formats. They could intersperse some videos related to what they're discussing, add visuals, or change the style of questioning. All our teachers teach in the same way.” The second theme is “assessment practices”. Under this theme, the codes include integrating quizzes, implementing weekly assignments, utilizing alternative grading methods, and incorporating student presentations. One of the instructors: “Assignments or quizzes could be given. Quizzes tend to motivate us a bit. Plus, you stay engaged with the class. Since they happen every two weeks.” The last theme is “teacher image”. The

codes for this theme include leaving a positive impression among students, demonstrating enthusiasm and dedication to their profession, exhibiting a proactive and agile character in class, engaging in self-marketing efforts, and promoting self-promotion. One of the students: “Teacher needs to do a bit of self-promotion, put in some effort. It creates a certain admiration for the teacher and admiration inevitably increases interest in the class.” Another student: “The teacher needs to portray a very positive image. The teacher should be very proactive and enthusiastic about their profession and their field.” These mentioned themes and codes along with quotations provide valuable strategies that can enhance interaction and learning in EMI courses.

In the focus group interview, the last key question aimed to explore scaffolding practices in EMI courses. The question was phrased as “Which of the learning support tools such as feedback (1), providing hints (2), giving directions (3), explanations (4), demonstrating as a model (5), and asking questions (6) do you observe in your classes? How do these tools affect interaction and your learning process within the lesson?”. Two main themes emerged from the responses on how these tools can impact interaction and learning. The first theme, "impact on learning and interaction," highlights the positive effects of these tools, and the codes include providing feedback, asking questions, modeling, and explanations on both learning and interaction. One of the students: “In-class questioning varies from one teacher to another. Some simply lecture and move on while others interactively engage by asking us questions.” Another student: “It seems like we observe almost all of them. Feedback is very important to me. Asking questions is also crucial. Providing explanations when we ask questions or giving instructions for the question are also effective ways to provide constructive feedback.” The second theme is "infrequent use of supportive tools" and it includes the limited use of these tools including

limited feedback in class and limited feedback for assignments and exam results, rare questioning by teachers, overcrowded classes and often reliance solely on lecturing. One of the students: “I don't think we always receive feedback. Whenever I ask a question, I usually don't get satisfactory answers most of the time.” Another student: “Asking questions may not be implemented and may not be useful in classes with 120 students. In classes with 40-70 students, these methods may facilitate more interaction, but it doesn't work in classes with 120-130 students”. These themes demonstrate that while some instructors are more keen on employing supportive tools, some do not, and this can create a feeling of frustration among students.

The final question in the focus group interviews served as a concluding prompt, inviting participants to adopt a teacher's perspective. Framed as "If you could change something about the interaction in classes, what would it be?", this question encouraged participants to reflect on potential improvements to classroom interaction from an instructional standpoint. Three themes emerged from responses to the last question. The first theme identified is "diverse teaching methods". The codes for this theme include simple student presentations, group work, slides with videos, avoiding monotony in teaching, utilizing the whiteboard instead of solely relying on slides, interactive lessons with questions, integrating theoretical concepts with practical applications such as laboratory work or field trips, and leveraging online platforms for interactive learning experiences. One of the students: “I would have students do simple presentations. I would ask them to spend ten minutes explaining a topic related to the lesson.” Another student: “I would consider changing presentation-based lessons. Presentation sessions tend to be more monologue-like and move quickly, which can hinder understanding”. And the other student: “I could increase the activities of asking questions in the lesson. Because I

think asking questions activities actually ensure the attention of the student to the lesson. Suddenly asking a question. In fact, I also would get some feedback from students in this way". The second theme identified is “course structure”. The codes for this theme include reducing class size, providing additional participation grades, incorporating small breaks during classes, informing students about quiz dates in advance, reducing the duration of classes per day, dividing the coursework into multiple sessions, decreasing the weight of quiz grades, and eliminating attendance requirements. One of the students: “"I would reduce the duration of the lesson. I would divide the lesson into two or three parts. I think we learn too much in one day. Almost half of a unit is completed.” Another student: “I would definitely reduce the number of students in one class” The last theme for the final question is "supportive and respectful environment". The codes for this theme include changing students' perspectives, promoting student self-confidence, fostering mutual respect between teachers and students, ensuring students feel valued by instructors, creating an enjoyable and comfortable setting for students, and eliminating feelings of embarrassment or discomfort. One of the students: “If we remove students' embarrassment, I think interaction in the class would definitely increase significantly. Because usually shyness decreases interaction due to the fear of making mistakes." Another student: “I would ensure that teachers show a bit more respect towards students. This would encourage students to engage more. Some teachers see students as disinterested. Some teachers don't care whether students are listening or not.” In conclusion, students seem to be aware of what they can do to enhance classroom interaction.

4.3 Findings of interviews with instructors

There were seven questions in the one-to-one interviews with the EMI instructors (see Appendix G). The questions used in the focus group interviews were adapted for the interviews with instructors. Some modifications were made to tailor the questions to the EMI instructors. Similar to the focus group interviews with the students, the interview questions with the EMI instructors were adjusted from An and Thomas' (2021) study. These question types were incorporated in line with guidance from experts on focus group interviews (Hennink, 2014; Krueger, 2014; Stewart & Shamdasani, 2014). The structure includes an introductory question to initiate the discussion. Later, a transition question was used to smoothly transition into the six main key questions. To conclude the interview, a comment question was posed to elicit participants' final reflections. In order to analyze the responses to the interview questions, a qualitative descriptive thematic analysis was employed to group the codes and form themes.

The first question posed to the instructors which served as an introductory question was: "When you hear the term teacher-student interaction, what is the first thing that comes to your mind?". Upon analyzing the responses to the question, three main overarching themes emerged. The first theme is "interactive classroom". The codes for this theme are student reactions to questions, active participation of students, student questions, in-class engagement and following the class. One of the instructors: "There should be an interaction between you and the students at the beginning and the end of the courses". The second theme is "accessibility of the instructor". The codes for this theme are utilizing social channels, responding to questions of students through emails or social platforms and fostering interaction outside the classroom. One of the instructors: "The interaction that we start in the

corridor or canteen also counts.” The last theme emerged is “supportive classroom setting”. The codes for this theme are the use of humor, breaking down barriers, valuing student opinions and prioritizing practicality of the course. These identified themes along with the related codes provide valuable insights for creating an inclusive classroom setting. One of the instructors: “Making a joke related to the lesson, but in a way that connects with the subject matter, can be a great way to start and create a light atmosphere. Also, reducing barriers to make students feel more included can be beneficial.” All in all, interactive learning atmosphere, accessibility of the instructors and psychological supportive class as main categories are associated with teacher-student interaction for EMI instructors.

The second question was a transition question towards the main key questions. It was framed as “How important is the interaction between instructor and student in the classroom for you? Could you rate it from 1 lowest to 5 highest? Why do you think so?”. Following the analysis of the responses, the average rating to the first part of the question was 4,5 out of 5, which indicates that interaction is a vital element in EMI courses for EMI instructors. One of the instructors who rated interaction five “If there's no interaction, I never proceed with the class." For the second part of the question, two themes emerged from the responses. The first one is “facilitating learning”. The codes for this theme are creating student interest, simplifying complex concepts, integrating real-world concepts into lessons, and aiding students follow the class. One of the instructors “We can just grab their attention. If there's something in the book that catches their interest, we have to make sure to engage them with it. If we can arouse that interest and guide them towards the book, that's crucial." The second theme is “increasing motivation”. The codes for this theme are personal motivation for instructors, breaking psychological barriers for

students, preventing boredom or monotony. One of the instructors “When you're not presenting something interactive, it becomes quite boring and monotonous, both for the student and the instructor, resulting in a routine lesson". Another instructor “When I receive answers to the questions I ask, or when I see attentive eyes listening to me, interaction isn't always verbal, sometimes it's through gestures and facial expressions. When I see this, my personal motivation actually increases significantly.” The other instructor "I know that in order for students to be fully receptive and focused on the lesson, those barriers need to be broken down. Interaction is the biggest factor in breaking those barriers." It is clear that both effective learning and enhanced motivation can be the reasons of creating an engaged classroom atmosphere for EMI instructors.

The third question was one of the key questions used in the interview. The instructors were asked as follows: “What do you think increases teacher-student interaction in the classroom?”. The analysis of the responses demonstrates that there are three main themes in the data. The first theme is “use of engaging teaching methods and activities”. The codes for this theme are asking questions, checking comprehension, diving the lessons into periods, using in-class activities, having pre-lesson preparation and planning, varying teaching activities, promoting group work, integrating small assessments such as quizzes, using bonus questions and avoiding routine in classes. One of the instructors: “Some of my colleagues conducted small quizzes instead of a big exam this year. Instead of having one big exam, conducting smaller quizzes can actually increase engagement. These small quizzes grab students' attention effectively.” Another instructor: “When there is group work, an activity, or an exercise, it significantly increases teacher-student interaction.” The second theme emerged from the data is “building rapport with students”. The codes for this theme

are valuing student answers, friendly relationship, instructor's approachability and sincerity, enjoyment in teaching, asking student opinions, initial warm-up interactions, demonstrating care and effort in teaching, instructor's remarkable background and instructor's gaining respect from students. One of the instructors: "Being able to connect with students on a friendlier level is important. I make sure to dress casually for class to create this atmosphere. Additionally, it's important to make students feel like I am approachable. I even share my phone number with them, so they can reach out to me anytime." Another instructor: "A teacher should show care for the students and make an effort to teach the lesson properly." And the other instructor: "It is important for the teacher to show that they are on the student's side." The last theme for this question is "incorporation of different learning experiences" and the codes that support this theme are using current topics, integrating practical applications, bridging theory and practice, utilizing simulations and case studies and implementing computer-based applications. One of the instructors: "I enable them to experience it directly by having them open the application from their computers, saying that we will see its implementation." Another instructor: "So, when we move from theory to practice, it seems to attract their attention a bit more, and being up-to-date. Interaction increases, of course, when something like a case study is done in class." The themes and codes along with the comments of the instructors suggest that classroom interaction can be enhanced by various factors both in-class and outside the class.

Question number four also concentrated on teacher-student interaction from a different angle. The question asked to the instructors was framed as "What do you think decreases teacher-student interaction in the classroom?". Upon the analysis of the responses of the EMI instructors, three primary themes emerged. The first theme

is “teaching approach”. The codes for this theme are static teaching methods, overemphasis on theoretical concepts or covering outdated topics, sole reliance on lecturing, monotonous teaching methods, long, uninterrupted class sessions without breaks, lack of preparation of instructors for class, continue teaching although students do not understand, relying only on PowerPoint slides, and lack of questioning in classes. One of the instructors: “If the student doesn't understand the lesson but the teacher continues, the interaction in the class drops to zero. If the student has lost track of the teacher, the interaction is over." Another instructor: “One thing is when the teacher never pauses. Having three consecutive hours of classes reduces interaction. After the first hour, students really start to disconnect.” The second theme emerged is “instructor disengagement”. The codes for this theme are low motivation and lack of enthusiasm in teaching, failure of taking teaching seriously, directing students to learn from sources outside the class, not taking attendance, not responding to messages on social channels, being too formal and not having an eye contact with students. One of the instructors: “When viewed from the student's perspective, some teachers' cold behavior can significantly reduce interaction”. Another instructor: “I also consider the response time to messages on social channels as important. When it is long, interaction tends to decrease. For instance, when a student sends an email and doesn't receive a response promptly, they might wonder why. But if you actively use these channels and can quickly address the student's issue, the interaction becomes more dynamic”. And the other instructor: “The instructor coming unprepared, and the students being unprepared, are factors that reduce interaction. In my opinion, regardless of the circumstances, an instructor should always come prepared to class. When this doesn't happen, interaction inevitably decreases.” The last theme out of these data is “student-related

factors”. The codes for this theme are lack of motivation, prejudice towards the subject, side conversations with other students, using mobile devices and coming to class unprepared. One of the instructors: “"If students enter the class with a prejudice, thinking 'This instructor teaches like this,' or 'This instructor is good or bad,' it breaks their connection. Their preconceived notions cut off the bond." Another instructor: “Incorrect use of technology also plays a role. For instance, excessive use of cell phones by students in the classroom reduces interaction.” Overall, these mentioned themes and codes supported with related quotations can give us valuable insights into the classroom interaction in EMI courses from the perspectives of the EMI instructors.

The next question was another key question in the interview, which asked EMI instructors “Can you give examples of support techniques you use to facilitate student interaction and understanding during the lesson?”. This main question was also complemented by additional supplementary questions when needed such as “How do you involve your students in your class? What kind of strategies do you use?”, “What are the commonly observed types of interaction in your classes? (Question-answer, in-class group work, whole-class discussion, feedback) and “Which of the learning support tools, such as feedback (1), providing hints (2), giving instructions (3), explanation (4), demonstrating as a model (5), and asking questions (6), do you use in your classes? (key Q.) How do these tools affect interaction and the learning process within the class?”. After analyzing the responses to the main question with the additional questions, three primary themes emerged.

The first theme is “scaffolding techniques”. The codes for this theme are in-class group work and pair work, asking questions, providing guidance, offering teacher feedback, facilitating in-class general discussions, utilizing translanguaging

techniques and incorporating peer feedback. One of the instructors: “I try to create groups as much as possible, but I try not to make it personal. Being personal can be quite awkward sometimes, like when I ask someone directly to speak, and it can make them uncomfortable. They might not even come to class again after that. Also, I switch languages. Sometimes I have to switch to English there. So, you're changing the language.”. Another instructor: “I assign project assignments in some of my courses, and they are usually in the form of group work. For example, I ask them to create an investment model, conduct its feasibility study, and then present it. There is also a general discussion in the classroom. After that, everyone gives feedback to each other.” The second theme is “supportive techniques”. The codes for this theme are starting with a video, selecting interesting materials, providing real-life examples, using visuals in the slides, utilizing the board effectively and incorporating gamification tools like Kahoot. One of the instructors: “I usually start all my classes with a video related to the topic of the week. These videos are usually selected from interesting materials. I try to include videos within the slides and add more visuals to make them more engaging.” The last theme emerged is “engagement strategies”. The codes for this theme are using humor in Turkish, positioning willing students in the front rows, motivating students, emphasizing the commercial aspect of the course and implementing rewarding methods. One of the instructors: “For example, when I start a class, I don't begin with a theoretical perspective. I first explain the financial aspect of the matter. Motivation is important. So, I tell students that this lesson is actually very valuable. It's necessary to make the student think like this. It's necessary to give the student this vision at the beginning of the semester, in the first class.” To sum up, when EMI instructors support their students, they can do so in various ways.

Question six was also a key question, which asked EMI instructors regarding the results of the employing supportive techniques on student participation. The question was framed as “How do support techniques during class affect student engagement? Have you noticed any changes in student interactions after using these support tools?”. Although some instructors provided brief responses such as “yes”, two themes emerged from the responses of other instructors. The first theme is “impact on interaction”. The codes for this theme are influence on interaction, immediate impact, positive effect, significant influence, increased participation, more responses even if not always correct and hopes a change on interaction. One of the instructors: “Yes. Participation increases. Even if it's wrong, at least they're giving an answer. Because otherwise, when you ask if anyone has any questions after explaining, usually nobody responds. I think it increases.” The second theme is “in a non-pressure, supportive manner”. The codes for this theme are adopting encouraging style, inviting comments rather than asking questions, integrating real-life examples and discussions, employing diverse methods and innovating approaches and avoiding a dictational style. One of the instructors: “I think it positively affects. But it has a positive effect when it's like this: when you're not pushing the students. When an open-ended question is asked, such as "What is your opinion on this topic?", I observe more participation. It's not pushy but supportive in nature when approached.” Another instructor: “I believe in trying more than just traditional methods and approaching with more dedication.” This question six also helps us understand the relationship between supportive techniques and interaction.

The final question of the interview with the EMI instructors was designed as an ending question for a concluding remark on classroom interaction. It was framed as "If you could change something about the interaction in classes, what would it

be?". This final question encouraged participants to think about all the preceding questions and comment to improve classroom interaction. Upon analysis of the responses, three main themes emerged from the data. The first theme is “more interactivity”. The codes for this theme are greater student engagement, more interested students, increasing interest in students and more interactive lesson format. One of the instructors: “I wish to change this: when a student makes a comment, I believe they shouldn't refrain from answering questions for fear of giving a wrong answer. I wish they could make comments without worrying about being wrong, with more confidence.” The second theme is “language of instruction”. The codes for this theme are delivering some lessons in Turkish and balancing English and Turkish in EMI courses. One of the instructors: “I would prefer to conduct the class in the native language. Especially, I would prefer to conduct the class in the native language for students in Turkey.” The last theme emerged is “more practical applications”. The codes for this theme are delivering some lessons in Turkish and balancing English and Turkish in EMI courses. One of the instructors: “I would prefer to conduct the class in the native language. Especially, I would prefer to conduct the class in the native language for students in Turkey.” The last theme emerged is “more practical applications”. The codes for this theme are more practicality in courses, more student-centered education, more applications, more resources, having assistant teachers and laboratory discussions. One of the instructors: “Implementing more practical applications within the course, whether in English or Turkish, would increase interaction. If possible, discussing topics in laboratory settings or including more hands-on activities in classes can enhance interaction and help students fully engage with the subject matter. Engineering, in essence, involves both theory and practice, and it's crucial to bridge the gap between

them.” In conclusion, EMI instructors are concerned about interactivity, language of instruction and practicality of the EMI courses.

4.4 Findings of classroom discourse analysis

This section will present the discourse analysis of scaffolding practices of the EMI instructors and their effect on classroom interaction across different departments. The first two research questions will be answered with the collected data. The first research question is based on the types of research questions employed by EMI instructors, and the second research question is based on whether students respond to these scaffolds and become more active participants in their EMI courses after scaffolding. In this part, scaffolding practices observed in recorded data will be listed and when and how they are used will be explained in detail. These data will also be supported by excerpts and analysis.

4.4.1 Business department

From the Business Department, the Financial Management course for sophomore students was recorded three times in one semester. This course was one of the EMI courses offered by the Business Department since it is a partially EMI department. The classroom had around 30 students, so it was not very crowded.

As an observation note, the instructor frequently used concept check questions such as “Does anyone not understand?” or “Are there any parts you want me to repeat?”. These questions indicate that the instructor expects students to ask questions; however, the students rarely do so. Consequently, the classroom teaching primarily consists of a monologue. During one class session, there were only four conceptual questions from students, but the instructor’s responses were limited to

explanations, which did not lead to meaningful interaction between the EMI students and the EMI instructor.

According to the new framework created for this study, the EMI instructor usually employed “bridging” during the warm-up part of the lesson to connect new information to prior knowledge. For instance, in one of the lessons, the instructor said, “the cost of capital is similar to the topics we learned last week.” “Bridging” not only takes place in the beginning of the lesson as a warm-up and transition to the lesson, but also to link old information with the new one between two inter-related topics within the lesson. To transition to the main topic, “contextualizing” and “instructing” scaffolds are employed. The instructor uses real-world examples to provide context for the unfamiliar topics. For instance, the instructor said, “market return is for example in Türkiye BISS 100 index, in the USA S&P 500 index.”. This approach provided a concrete example to help students understand the concept better. Additionally, “demonstration” was the most frequently used scaffolding, which showed students how to perform the financial calculations on board step by step. The EMI instructor usually said, “Let’s do the calculations on the board for this example.” Since the observed financial management lessons were largely based on interest calculations per year and per month, the EMI instructor showed significant effort in demonstrating the steps of calculation for each concept.

In order to help students understand better, only cognitive scaffolds such as “giving tips” on how to carry out these calculations and “explaining” to clarify concepts were used. For example, the instructor said, “I in the calculations means coupon.” For assessment purposes, only concept check questions (CCQs) were utilized in a limited way. For instance, during one class session, the instructor asked, “Anyone who has questions?” or “Any part you want me to revise?” seven times;

however, the students did not respond to these questions. Beyond CCQs, no specific questions were employed to assess student comprehension, and therefore no feedback was provided to students.

Finally, for metacognitive support, only some critical features of the calculations and concepts were highlighted by the EMI instructor. For example, the instructor said, “Here, be careful that coupon is not based on percentage; it doesn’t say ten percent or five percent. Here we use Dollar or Turkish lira currency.” This metacognitive scaffolding directed students’ attention to important aspects to focus on during exams.

Overall, the EMI instructor in this department employed conceptual and cognitive scaffolds during the lesson but used few affective and metacognitive scaffolds. Additionally, assessment and guiding scaffolds were rarely used. Scaffolds such as “Schema Building,” “Reduction in Degrees of Freedom,” and “Cognitive Structuring” were not utilized to simplify or amplify concepts for students.

When the interaction patterns were analyzed, the Initiation-Response-Feedback (IRF) pattern was not common in the classroom. The instructor mainly delivered content through lectures. During one class session, only four students asked questions about parts they did not understand. The instructor responded by explaining and sometimes giving hints, which did not lead to extended IRF interactions. For example:

S: "How can we understand which calculations to use in this question?"

T: "You should check whether the question asks you to calculate monthly or yearly."

S: "Okay, thank you."

Most question-and-answer patterns were similar to this student-teacher exchange. As a result, such limited turn-taking patterns did not foster significant interaction between the EMI instructor and the EMI students.

On the other hand, scaffolding techniques used to introduce new concepts, such as “bridging” and “conceptualizing” might have captured the students’ attention. Additionally, “providing hints” and demonstrating calculations by writing them by hand on the board likely kept students more engaged. This was evident as several students, especially those sitting in the front row, began taking notes or took photos of the board before it was erased. Nevertheless, the lack of interaction between the instructor and the students might have led to fewer questions when students did not understand something. The absence of an interactive atmosphere may have also caused some students to lose interest in the course.

In conclusion, the discourse analysis revealed a limited variety of scaffolding practices to engage students, resulting in limited classroom interaction. Predominantly using the board and slides throughout the lesson likely influenced the types of scaffolding utilized, creating very few opportunities for interaction between the EMI instructor and the students.

4.4.2 Physics department

From the Physics department, the X-ray Technologies course for senior students was recorded three times in one semester. The X-ray Technologies course was offered as an elective course for students, with around 10 students. Therefore, it was less crowded than other EMI courses and it provided a more comfortable learning atmosphere where students were more willing to participate. The Physics department is 100% EMI department so this elective course was also delivered in English.

As an observation note, the EMI instructor asked more questions compared to the business course. In one class session, the instructor asked a total of eight concept check questions (CCQs) to ensure student understanding. However, the number of the student questions was very few in this course as well. Students might have been reluctant to ask questions or busy trying to understand the lecture. Overall the lecture was mostly conducted in English, but when the instructor wanted to emphasize important parts or provide real-life examples, he occasionally switched to Turkish.

According to the new framework created for this study, the EMI instructor uses "bridging" scaffolding during the warm-up part of the lesson to connect new information to prior knowledge. At the beginning of the lesson, after the initial greeting, the instructor said, "Let's summarize the previous lectures. In the first lecture, we have given general information about X-rays, and we have discussed the safety issues and applications. We have discussed them. And in the second lecture, we have discussed the X-ray sources, right? We have seen different types of X-ray sources: X-ray tube, free electrons…" The instructor continued, "And today we will see X-ray detectors."

The instructor wrote the discussed points on the board as a bulleted list and waited for students to complete his sentences related to examples of X-ray sources. After the summary, the instructor wrote the new topic to be studied during that class period, indicating the objective of the course to the students from the very beginning. This statement of the objective can be seen as affective scaffolding, such as "recruitment," or cognitive scaffolding, as it helps students understand the relevance of the course to previous lessons.

In this respect, the instructor spent a considerable amount of time bridging the previous lectures to the new one to prepare students for the new content.

Additionally, the instructor used “direction maintenance” scaffolds to keep students focused by saying, “Please don’t look at me like you are hearing this for the first time. No, we have seen this.” Reminding students to be aware of the previously studied lectures was a common practice, as the instructor repeatedly asked students to review the previous courses.

Furthermore, the instructor guided students to study from different sources. He said, “As useful books, I can suggest you have this 'Radiation Detection and Measurement' written by Glenn Knoll. As far as I know, this book is available in our library.” This recommendation can be considered a “developing metacognition” scaffold, as it encourages students to engage in independent learning and utilize additional resources.

To transition from the warm-up to the main topic, there were no evident scaffoldings. The transition was very quick, and scaffoldings such as “contextualizing,” “modeling,” and “demonstration” were not observed. However, once the instructor began the main topic, various scaffoldings were employed to aid student understanding. For example, the instructor wrote the intensity of the X-ray formula on the board. He wanted to illustrate the absorption moves, photons and the thickness of the material. This type of scaffolding can be considered “reduction in degrees of freedom” as the instructor aims to simplify the complexity of the problem-solving process. Additionally, this process can be an example of “modeling” scaffolding as the instructor demonstrates the problem-solving steps to reduce complexity for students.

Additionally, the instructor tends to use “contextualizing” scaffolds to help students understand the content through real-life examples. In the first observed lesson, the instructor showed different body parts with X-ray images and asked

students to imagine a stone in the kidney, which could be detected by X-rays. To illustrate the use of X-rays in daily life, the instructor mentioned, “Think about the X-ray CCD detectors we use in hospitals, modern tomography machines, and even in shopping centers. For example, we have a bag, and there is an X-ray machine—actually, it is a tomography machine. You put your luggage into the X-ray machine. Or we could use X-ray detectors in space, like in the James Webb telescope, to get two-dimensional pictures of galaxies.” In another instance, he said, “We use photo pixels in cameras for mobile phones and video cameras that you see in the classroom now.”

The instructor also used “contextualizing” scaffolding in order to help students understand abstract concepts. After a student asked a question about “photosensitive material”, the instructor explained this by providing a real-life example from past technological applications in Turkish. He said, “In the past, photo stores replicated your photos from negatives. The had dark rooms. This name comes from "negative photosensitive material". They could replicate your negatives”. When the instructor explained the concept in the native language coupled with real examples helped students understand the content better and increased their interest in the topic.

These real-life examples demonstrate that the instructor makes an effort to help students understand the practical applications of X-ray machines clearly. This approach encouraged students to participate more since they could see a clear connection between their course content and its real-life applications.

In addition to the “contextualizing” scaffolds utilized by the instructor, cognitive scaffoldings, especially “cognitive structuring”, was employed to help students understand the content better. The instructor used visual aids, such as

drawing the electrical current system on the board, and then asked students to answer a question step by step. Instead of modeling the answer himself, he guided students through the steps, scaffolding by “reduction in degrees of freedom.”

Moreover, the instructor frequently summarized the content from the beginning of the lesson. This approach plausibly aimed to simplify the content and structure it in a way that facilitated better understanding for the students, which can be categorized as “cognitive structuring” scaffolding. Since the instructor organized and summarized the information, he helped students build a clearer mental framework of the concepts.

Finally, to help students understand the content better, the instructor used code-switching as a scaffold. He sometimes translated key terms into Turkish to make sure students understand their meanings. In addition, when students asked questions that required detailed explanations, he provided these details in Turkish. The instructor also used Turkish when giving real-life examples to capture students' attention. This strategy can be regarded as both affective and cognitive scaffolding. Affectively, students felt more comfortable since the stress level of the classroom atmosphere was reduced through code-switching. Cognitively, it aided in understanding by reducing the cognitive load. When the instructor switched to the students' native language, students accessed to complex concepts more easily and with less cognitive load.

For assessment purposes, a variety of different scaffolds were used in physics classes. The instructor mostly asked questions in English to check student comprehension, and students were able to respond in English. Out of 18 questions asked, 13 were in English to check comprehension and two questions were in Turkish. Three of them were concept-checking questions such as "Is it clear?" and

"Do you understand?". Additionally, there were "direction maintenance" questions like "Are you with me?" and "Are you listening?". These questions were used to keep students stay focused and ensure they were following along with the lesson.

To illustrate conceptual questions, the instructor asked, "What are the absorption products? Absorption products, please..." and some students responded in English. Sometimes the instructor directed a question to a student who seemed to not comprehend the content. When the student couldn't answer, the instructor often waited for other students to respond before providing the answer himself. Occasionally, he listed options on the board as a "reduction in degrees of freedom" scaffold. For example, when he asked "Which gas atom should I use here?", he listed gas atoms on the board.

When students did not answer a question, the instructor sometimes drew an electron system on the board instead of giving the answer directly. This was a "representing text" scaffold, providing a visual representation to make abstract concepts more concrete and accessible, thus aiding comprehension. Additionally, the instructor explained the concept to further scaffold students' understanding by clarifying the concepts after questions.

In addition, the instructor tried to maintain eye contact with students and made an effort to engage with each one individually. This was possible due to the fact that there were only eight to ten students in the classroom. This helped keep students focused, and the frequent questioning by the instructor further encouraged student engagement. Students asked questions both in Turkish and in English. When a student asked a question in Turkish, the instructor waited for another student to answer. After receiving responses, the instructor answered the question in English.

Similarly, when a student asked a question in English, the instructor directed the question to the class, and a student responded in Turkish.

Switching between English and Turkish was a common practice to aid comprehension during the assessment part of the lesson. The instructor's positive feedback, such as "that's a nice question" or "that's a very good question," encouraged other students to participate. This encouragement resulted in more questions from students. Furthermore, affective scaffold was employed when the instructor responded to student answers. In another example, he said, "Yes, that's true. You will be a famous physician in the future". This sentence affectively influenced the students and motivated them to engage more.

Regarding metacognitive scaffolding, the instructor employed several "marking critical features" techniques to draw students' attention to key parts of the material. He often said things like, "I will ask this in the midterm or final exam" or "This formula is a life-saving formula. If you keep this formula in your mind, you can solve all the problems in this lecture". Additionally, the instructor used "developing metacognition" scaffolds to enhance students' awareness of their own learning processes. For example, he advised students to review previous lessons, especially for those who missed earlier classes because the new content was built on previous lessons.

The instructor in another example discussed the technical specifications of a student's mobile phone camera, linking it to the course content. He said, "These are all related to basic physics. They are related to our course content". Such examples helped students become more metacognitively aware of how their physics course related to real-world applications and everyday life. This examples might have contributed to a deeper understanding of the subject matter.

To sum up, various scaffolding techniques were employed by the EMI instructor in the physics classes to enhance student learning. Conceptual scaffolds included “bridging”, “contextualizing”, and “representing text”. Cognitive scaffolds involved “direction maintenance”, “schema building”, and “reduction in degrees of freedom”. The instructor also used affective scaffolds like “recruitment” to engage students. Metacognitive scaffolds including “marking critical features” and “developing metacognition” were utilized during the lesson, albeit not very frequently. Questioning and feedback for assessment were utilized as a common practice. These strategies altogether supported student comprehension and engagement in the physics course.

When the interaction patterns were analyzed, the Initiation-Response-Feedback (IRF) pattern was more common in physics classes. The pattern of turn-taking varied. Sometimes the EMI instructor asked questions to his students after explaining a topic. On some occasions, the instructor asked a conceptual question related to the previous lecture, and one of the students answered the question without waiting. In one example,

T: “What are the absorption products?”

S: “Photoelectrons, fluorescence x-rays, AUKEY electrons”

T: “Yes, photoelectrons, fluorescence x-rays, AUKEY electrons” (correcting the pronunciation and writing them on the board for other students to see)

In such conversation patterns, when a student answered the question easily, the turn-taking exchange was usually short as in the example, Initiate-Response-Feedback. However, this was often coupled with a "representing the text" scaffold for other students, which extended the interaction. Therefore, the pattern might be framed as Initiate-Response-Feedback-Scaffold (I-R-F-S):

In this pattern:

The teacher's question is the Initiate.

The student's answer is the Response.

The teacher confirming the correctness of the student's answer with “yes” is the Feedback.

Finally, the teacher providing additional support by correcting pronunciation and writing the terms on the board to help other students understand and learn is the Scaffold.

Supporting students with a scaffold after the feedback would confirm what students have said and make them feel more comfortable with more details. Sometimes the students asked questions in Turkish, and the instructor responded in Turkish too. For example,

S: “Röntgen kağıdının rengi beyaz mı? (*Is the color of X-ray paper white?*)”

T: “Hayır, beyaz değil. Şeffaftır. (*No, it is not white. It is transparent*.)”

S: “Kemikler röntgende beyaz görünüyor. (*The bones look white on X-ray*.)”

T: “Hayır, kemikler beyaz değil. Şöyle açıklayayım. Buradaki kimyasallar röntgen kağıdına işlediğinde, nasıl görünüyor? Daha beyaz, daha şeffaf, değil mi? Diğer taraflarda ise madde var, bu yüzden daha koyu görünüyorlar. Veya negatif kimyasallarınız varsa, böyle görünüyor. (*No, the bones are not white. Let me put it this way. When the chemicals here leave on the X-ray paper, how does it look? It looks white, more transparent, right? On other sides, it has materials, so they look darker. Or if you have negative chemicals, it looks like this*.) (starts writing and drawing on the board).

In this turn-taking exchange, Initiate-Response-Initiate-Response was followed. The conversation progressed within the exchange of turn-takings as explained below:

The Initiate is the question by a student.

The Response is the answer by the teacher.

The Initiate is the follow-up statement by the student.

The Response is the detailed explanation by the teacher.

After this conversation, the instructor began explaining the topic in English. Following a brief explanation, he gave a real-life example on the use of "negatives" in Turkish. It was a common practice for the instructor to code-switch between languages especially when students asked questions or required more detailed explanations.

In conclusion, the discourse analysis revealed a greater variety of scaffolding practices to engage students, resulting in increased classroom interaction. The use of multiple scaffolds created more opportunities for interaction between the EMI instructor and the students, both in English and Turkish. This variety of scaffolding strategies contributed to a more dynamic and interactive learning environment. This interactive and more comfortable environment could also be attributed to the fact that there were fewer students enrolled in the EMI course.

4.4.3 Chemistry department

From the Chemistry Department, the Mathematics for Chemists course for sophomore students was recorded three times in one semester. The Mathematics for Chemists course was also offered as an elective course for students and the classroom had around eight students. This EMI course was conducted in a computer

lab, so they had to sit at a computer desks. It was less crowded than other EMI courses and they could apply what they learned on a computer program. As the Physics department is 100% EMI department, this elective course was also delivered in English.

This math course was structured on two main activities: first, the instructor demonstrated calculations on the board, and then students applied these calculations using the Mathcad program on their computers. As an observation note, the structure of the course limited the interaction between the instructor and the students. The focus of the instruction primarily involved performing calculations on the board and then replicating them on paper and using the Mathcad program. Consequently, this approach did not foster a high level of turn-taking and long Initiation-Response-Feedback (IRF) pattern in classroom interaction.

In one class session, the instructor asked a total of five concept check questions (CCQs) to ensure student understanding. However, the number of student questions was also very limited in this course. This might stem from the fact that the total number of students enrolled in this course was only 11. Consequently, students might have been unwilling to ask questions or too busy trying to understand the calculations. Although the lecture was mostly conducted in English, the instructor switched to Turkish to stress important parts for those who did not comprehend how to perform the calculations on the computer program.

According to the new framework created for this study, the EMI instructor uses conceptual scaffolds such as “bridging” to connect the previous lesson’s topic to the current one and affective scaffolds like “recruitment.” The instructor said, “Last lesson, we tried to solve an equation. Like a linear equation. It is very easy. You can even do it by hand.” In this sentence, the instructor used both conceptual and

affective scaffolds at the beginning of the lesson. Once the instructor noticed the students looking at the computer screens, which were intended for use with the Mathcad program, he tried to keep the students focused on the lesson by employing "direction maintenance" scaffolding. He said, "Guys, don't use your computers yet. I will let you use them, and you will use them a lot, really. But for now, listen to me."

To help student comprehension, the instructor frequently utilized cognitive scaffolds like "demonstration", "modeling" and "cognitive structuring". For demonstration purposes, the instructor showed the process of solving calculations step-by-step through a projector. Additionally, the instructor provided an example on the board and solved the equation in a similar step-by-step manner, which exemplifies the use of "demonstration" scaffolds. For modeling, the instructor illustrated the bisection method by drawing the x and y axes and explaining the relationship, which falls under "Representing Text" scaffolding. This visual representation helped clarify the method. As for "cognitive structuring," the instructor organized previous information on the board, highlighting key concepts and showing their relationships through arrows. For example, the instructor said, "This is, also, what we covered in the last class," which helped students connect previously studied topics to the new ones.

To aid cognitive understanding more, the instructor broke down the problem into steps: "There are four steps" (writing on the board) "Step 1, guess a value, x0 value. Step 2, evaluate f of x …" and so on. The instructor reinforced this understanding through practice, and he said, "So, let's implement this idea for the same problem on Excel. Open another sheet. Watch me doing this, okay? I have an x value …". The instructor also employed "instructing" by giving clear and direct instructions through these equation solutions. By demonstrating each step, the

instructor ensured that students were on the right track both cognitively through "Cognitive Structuring" and conceptually through "Representing Text".

Additionally, to aid comprehension, the instructor frequently utilized "representing text" scaffolding by projecting an Excel sheet from his computer to apply the formula studied in the classroom on the board. Such "representing text" scaffolds helped students follow the formula and its application in different contexts. For instance, the instructor encouraged students to implement the same formula on the Mathcad program, saying, "If you are given a function, let's try to do one of them. We have solved two problems in Excel. Let's input one of the functions into Mathcad." Performing equations on both Excel and Mathcad was another form of "representing text" scaffold. As a result, students were more focused on the projected screen, comparing their results on the program with the projected ones.

When the instructor noticed that students were struggling to understand, he occasionally employed "reduction in degrees of freedom" scaffolding. For example, he used a graphical method to explain the solving process, which simplified the task and made solving equations easier on the computer. Moreover, the instructor helped students do the coding on the Mathcad program by standing by their computers, checking their work and providing help as needed. This approach simplified the task complexity for students and created a supportive atmosphere that increased student motivation and managed their emotions.

The instructor mostly spoke in English when the students were able to follow the lesson, but when students encountered comprehension difficulties, the instructor repeated the same instructions in Turkish. This extra language support helped students clearly understand the steps to take. Consequently, students were affectively scaffolded through "Contingency Management/Frustration Control" scaffolds. Since

they felt more supported, they were able to overcome challenges with additional language support. Overall, the combination of scaffolds to aid comprehension, visual representations, and hands-on experience with the computer, supported by affective scaffolds, proved to be an effective strategy for engaging EMI students in math classes.

To affectively motivate students during the classes, the instructor utilized "Reduction in Degrees of Freedom" scaffolds. For instance, he said, "Let's make it easy, so that we can solve an analytical solution." This approach directed students to follow a simpler method for solving the problem. He also used phrases like "It is very easy, piece of cake, but you may have a very complicated problem. I am showing you a simple example so that you can have an analytical solution." By using encouraging phrases like "very easy" or "piece of cake," the instructor wanted to motivate students by reducing perceived complexity and creating a more positive learning environment.

The instructor employed both cognitive and affective scaffolds to keep students engaged in addition to these motivational strategies. For example, the instructor employed "Direction Maintenance" scaffolds by continually referring students to the formula structure written on the board. On the board there were three methods for solving the equation. The instructor asked students to look at these methods throughout the lesson. Thanks to this scaffolding, students were able to stay focused and solve the problems.

Additionally, the instructor actively encouraged student questions to foster a supportive learning atmosphere. In one instance, the instructor asked:

T: "Okay?

S: ……..

T: Alright?

S: ……..

T: If you don't follow at any point, please interrupt me and stop me because these are very critical, and you will be asked questions about this in the final exam. If you cannot do it, please ask for my help. ……

T: You couldn't do it. (pointing at a student)

S: No, I can do it.

T: OK. Good.

By highlighting his expectation for questions and offering support in this conversation, the instructor helped students feel at ease more and encouraged them to seek help when needed.

Moreover, the instructor utilized "recruitment" scaffolds during the lessons to engage students and aid their understanding. For example, he asked, "Has anybody heard of the Dickson Raphson method?" while writing and listing the methods on the board as a "cognitive structuring" scaffold. The instructor integrated affective scaffolds with cognitive scaffolds. As a result, he helped students understand complex mathematical methods like the Dickson Raphson method.

Code-switching strategies were also utilized by the instructor. For instance, when explaining key terms related to calculations on the Excel program, he said, "If this value is absolute value, absolute value, you can say 'mutlak' in Turkish". He continued, "Arkadaşlar 'abs' mutlak, 'if' eğer, you will have to put Excel in this form in your Turkish version". This approach helped students understand the program's terminology in both languages, increasing their awareness of the program's language options.

When students struggled with comprehension, the instructor often switched to Turkish to clarify concepts. For instance:

T: “Let me explain this to you in Turkish.”

T: “Arkadaşlar Mathcad’te iterative bir işlem yapıyorsanız, bana bakın, bizim formülümüz neydi arkadaşlar?” (*Friends, if you are performing an iterative process in Mathcad, look at me, what was our formula, friends?*) (writing the formula on the board).

T: “Şimdi burada bir point var. Bisection method, as we have seen in previous examples, is not guaranteed to find the root of the solution.” (*Now, there is a point here. Bisection method, as we have seen in previous examples, is not guaranteed to find the root of the solution.*)

In another example, after assessing student comprehension:

T: “We are good? We are happy?”

S1: “I don’t understand.”

T: “Which one don’t you understand?”

S1: “How can I do this on Excel?”

T: “You put this ‘EĞER’ (*IF*) with equal sign. OK. In Turkish, ……..” (The instructor starts explaining in Turkish.)

By using code-switching and translanguaging, the instructor addressed students’ needs more effectively and ensured that they understood the content thoroughly. In this example, the instructor aimed to assess student comprehension, but when a student asked a question, he switched to Turkish to provide a clearer explanation.

For assessment purposes, the instructor sometimes used “questioning” scaffolds. For instance, he asked, “Do you remember all these three?” after

reviewing previous topics. In another case, he asked, “Who remembers the bisection method?” to check if students recalled previously covered material. However, assessment questions which aimed at scaffolding students cognitively were not very common. Additionally, students were mostly silent when the instructor asked questions. Therefore, the instructor had limited opportunity to give feedback on student performance.

Regarding metacognitive scaffolds, the instructor occasionally used “questioning” to prompt metacognitive thinking such as asking “What did we say?” to encourage student reflection on their learning and recall key points. The effectiveness of this scaffolding is uncertain, as students often did not respond. The instructor also employed “Marking Critical Features” to highlight important points. For example, he explained, “This is something we should know. If you use the bisection method or any other numerical method, it is not guaranteed to find a solution. Sometimes it gets stuck. If you use random number generation, because the equation here never goes below zero, the bisection method won’t solve it.” This aimed to point out limitations in the problem-solving methods being used. Moreover, he promoted self-awareness in learning with “Developing Metacognition” scaffolds, such as explaining the advantages and limitations of the Newton-Raphson method compared to others.

To sum up, the EMI instructor in the chemistry classes employed a range of scaffolding techniques to enhance student learning in mathematical operations. Conceptual scaffolds included “Bridging” and “Representing text” while cognitive scaffolds involved “Direction maintenance”, “Cognitive structuring” and “Reduction in degrees of freedom.” Affective scaffolds such as “Recruitment” and “Contingency Management/Frustration Control” were used to increase student engagement.

Although questioning was used for assessment, it was not very frequent. Metacognitive scaffolds like “Marking critical features” and “Developing metacognition” were also utilized. These strategies aimed to support student comprehension and engagement, but the interaction between the instructor and the students was limited, suggesting a need for more interactive and collaborative scaffolds.

In such a course, when analyzing interaction patterns, the Initiation-Response-Feedback (IRF) pattern was not common in chemistry classes, and the pattern of turn-taking was also limited. For example:

T: “Who remembers bisection method?”

S: “Somehow, not all of it.” (One student is trying to answer)

T: “Tell me what you remember.”

S: “at the end of bisection, we say a and b….. and if f of a” (the instructor nodded his head to approve) but the instructor started teaching.

T: “they have to have different time and like, so bisection method takes two different initial guesses and function on each different value.”

In this turn-taking exchange, Initiate-Response-Scaffold-Response-Scaffold was followed. The conversation progressed within the exchange of turn-takings as explained below:

The Initiate is the teacher question to prompt recall of the bisection method.

The Response is the student’s attempt to answer, indicating partial recall.

The Scaffold is the encouragement of the instructor to the student to elaborate on their understanding.

The Response is the student explanation of his understanding.

The Scaffold is the teacher providing additional explanation to clarify and complete the student's understanding.

In this exchange, the instructor used “questioning” scaffolding to encourage the student to expand on their response and think more deeply about the topic. Although the instructor approved the student's initial explanation with a nod, the student struggled to continue, so the instructor provided a scaffold of “instructing”. Despite these scaffolds, the student’s response remained limited. Incorporating more interactive scaffolds could have fostered a more engaging and detailed conversation.

In another example, to check student comprehension, the instructor asked:

T: “Okay?

S: …….. (No response)

T: Alright?

S: …….. (No response)

T: If you don’t follow at any point, please interrupt me and stop me because these are very critical, and you will be asked questions about this in the final exam. If you cannot do it, please ask for my help. ……

T: You couldn’t do it? (pointing at a student)

S: No, I can do it.

T: OK. Good.

In this conversation exchange, the Initiate-Initiate-Scaffold-Initiate-Response-Feedback was followed:

The Initiates are the teacher attempts to check the students’ understanding but there is no response from the students.

The Scaffold is the teacher providing encouragement, explaining the importance of the material and inviting students to ask for help if needed.

The Initiate is the teacher addressing a student.

The Response is the student respond.

The Feedback is the teacher acknowledging the student's response.

In this turn-taking exchange, although the instructor initiated a conversation to check for comprehension, the students were reluctant to participate. Despite the instructor's efforts to support, assess, and provide feedback on comprehension, the students remained inactive. For example, the instructor asked one student who appeared unsure, but the student responded briefly and did not engage further. Most of the conversations with other scaffolds observed in the chemistry courses followed a similar pattern. For instance:

T: "What's my derivative?"

S: ……

T: "My derivative is three times minus three times four square."

Even though the question pertained to a straightforward mathematical operation, the students did not respond. In another instance, the instructor used Turkish to elicit a response, but the students remained silent:

T: "Arkadaşlar hangisi daha hızlı converge oluyor?" (*Friends, which one converges faster?*)

S: ……

T: "Bisection method biraz daha hızlı converge oluyor. O 20 adımda yapmıştı. Bu ise 50 adımda yapıyor." (*The bisection method converges a bit faster. It did it in 20 steps, whereas this one does it in 50 steps*.)

Even when the question was posed in Turkish, the students did not engage in the conversation.

In conclusion, the discourse analysis of the chemistry courses revealed various scaffolding practices to engage students, but although multiple affective, cognitive and conceptual scaffolds usually create opportunities for interaction between the EMI instructor and the students, they did not result in increased classroom interaction. The scaffolds employed here could have been more interactive and engaging. For example, incorporating group discussions could have enhanced classroom interaction. Consequently, although the scaffolds employed in this course have supported student comprehension, they did not foster interaction between the instructor and the students. This might stem from the types of scaffoldings employed, the EMI course environment or the nature of EMI course.

4.4.4 Civil engineering department

From the Civil Engineering Department, the Construction Management course for senior students was recorded three times in one semester. the Construction Management course was designed as a compulsory course for students and the classroom had around 45 students enrolled. This EMI course was conducted in a lecture hall where students were seated like in a theater room. Although not all seats were occupied, the atmosphere was different from a typical classroom setting. As the Civil Engineering department is 100% EMI department, this compulsory course was also delivered in English.

This course was primarily verbal and it focused on construction projects and planning projects. Although the content was conducive to classroom interaction, there was a lack of significant turn-taking and extended Initiation-Response-Feedback (IRF) patterns in the interactions observed. During the lecture, the instructor asked several questions before introducing the main concepts to assess

student understanding. However, most students were reluctant to engage with these questions, resulting in a largely monologue-based lecture. The instruction was mainly conducted in English, but the instructor frequently switched to Turkish to rephrase questions, tell stories or make jokes. Despite these efforts, student interaction with the instructor still remained limited.

According to the new framework for this study, the EMI instructor did not utilize conceptual scaffolds such as “bridging” or “contextualizing” to prepare students for the content. Instead, the instructor began with an affective scaffold, specifically a “recruitment” scaffold. She started the lecture by displaying the topic title on the slide and asking, “Do you have any idea what lean is? Have you ever heard about lean construction? What is lean construction?” However, she received no responses from the students. This lack of engagement may be attributed to the absence of conceptual scaffolds to capture student attention, leaving them unprepared to engage with the lesson effectively.

Then the instructor began to answer her own question: “Lean construction is to simplify processes in construction operations.” After this brief explanation, she aimed to provide an example she thought might interest the students. She continued with a conceptual scaffold, “contextualizing,” saying, “Think about myself. Consider that I am a construction worker and just started to work on a construction site, so I am thinking as a productive person. Can I do my task in five steps instead of 10? How can I reduce the number of processes? How can I get to the place in the most effective manner? At the same time, how can I increase productivity?” The instructor used this real-life scenario to help students relate to the content. This approach could also serve as potential metacognitive scaffolding, encouraging students to project themselves as project managers and enhance self-awareness and reflection. However,

the lecturer did not receive a response, and students remained disengaged with the provided scaffolding.

To help students understand, the instructor employed “bridging” scaffolding by comparing lean construction with agile construction to link new content with previously taught material. She explained, “While agile construction is also very similar to lean, agile focuses more on products, whereas lean emphasizes processes.” Later, the instructor used “contextualizing” scaffolding once again to provide examples of construction project overruns. She said, “Construction project overruns occur when a project exceeds its initially planned budget, schedule, or scope. For example, the Sydney Opera House’s final cost was fifteen times higher than originally planned, and the Boston Arterial Tunnel’s final cost was 196% more than initially planned. These are serious cost overruns.” These examples helped students understand and visualize abstract concepts such as “lean construction” and “project overrun,” serving as both “Reduction in Degrees of Freedom” cognitive scaffolding by simplifying the concepts and as affective scaffolding by capturing student attention.

During the lessons, the instructor also utilized questions to recruit student attention. She often provided a context and then asked what the reasons might be:

T: "What might be the reason behind these cost overruns? Why such a thing might have occurred?"

S: "Maybe increasing the material cost."

T: "Yes, material cost might have been increased. This might be one of the important causes of such cost overburdens. And what else might be the reason behind such high-cost overruns?"

S: …….

T: "Poor planning, right? Poor planning of materials, resources, …."

Although the instructor employed questioning scaffoldings to recruit student attention, the students did not engage in the conversation. Those who responded to the questions only provided short answers, and the turn-taking did not continue. The instructor kept asking questions after each subtopic to elicit responses and attract student attention, but the students did not react to the teacher's questions. Usually, the questions were conceptual, and the students generally remained silent, or one student sitting in the front seat would respond with one or two words in Turkish. In another example, the instructor asked a similar question about a different subtopic. The conversation and limited turn-taking were also similar because the questioning style and the response style were almost the same:

T: what might be the reason behind? Why construction productivity is very low compared to other industries? What might be main reason behind? Any comments?

S: …….

T: Yani inşaat projelerinde üretkenlik neden düşük sizce? (*So, why do you think productivity is low in construction projects?*)

S: ……..

T: What is productivity? Productivity in construction? What does that mean?

S:…….

T: Productivity is to perform a task on time, right. With the resources provided to you. So, what might be the reason behind low productivity in many of the construction projects?

S: We can change using material.

T: Yes, material can be a reason for the low productivity. If the material is not applicable for the project chosen. Yes, you can change the material to increase the productivity. What else?

S: Skilled labor.

T: Yes, this is also one of the main reasons behind low productivity, especially construction projects. What else? What might the reason?

S: Exchange rates.

T: Of course, exchange rates can be a serious reason for that, especially in developing countries like Turkey. What else?

S: Inflation.

T: Yes inflation. Economy.

S: Gelişimin ağır olması (*the slow pace of development*)

T: Yes, innovation capability low in such countries. It is also one of the reasons behind low productivity.

In such a long conversation, although the instructor sometimes employed code-switching strategies and provided the Turkish meaning, the students seemed disinterested. This lack of interest and interaction made it difficult for the instructor to focus on the content. It can be inferred that asking questions before introducing the new content is simply not enough to start a discussion and lead to interaction.

The instructor utilized interesting facts related to the content to recruit student attention. The instructor used the Toyota house structure as an interesting fact. She said, “This is called a Toyota house. This is where the production system of Toyota relies on.” The instructor showed the picture of this Toyota house system on the board to capture student interest and engagement, and the students were more focused on the picture of the Toyota house system on the slide. Additionally, the

instructor gave scenario examples. In one lesson, she said, “For example, as a customer, I am ordering a bottle of water from somewhere. If the bottle of water is not coming on time, as a customer, I am not satisfied at all. Can you talk about a high-quality process there? No, because I am not satisfied due to this let’s say slow process.” By utilizing real-life examples, the instructor was able to deliver the content better and help students remember the concepts.

Real-life examples can serve as a “Contextualizing” scaffolding. In one of the lessons, she provided an example about her lecture and midterm exams. She said, “In lean construction, one of the most important principles is to eliminate non-value adding activities. For example, if I just invite a speaker to this lecture, I don’t let the speaker talk. Is this a value-adding activity? No, right?” In another conversation, she said, “Let’s consider that you are having your second mid-term exam. And I ask you questions about construction management. But you just provide answers from another class context, for example, steel structure. So this is a non-value-adding activity.” Through these examples, the instructor wanted to recruit attention and interest by contextualizing the content with real scenarios. In this way, students can also apply these examples in different scenarios.

As a conceptual scaffolding, the instructor also used “Representing Text” to make the content more accessible for the students. In one example, the instructor showed an x, y coordinates on project size vs. cost escalation, projected on the slide. The instructor said, “You will understand now more easily. This is the project size vs. cost escalation in projects. What about the construction productivity? If you look at this graph, you are going to see that real productivity by industry in the US in the 1950s.” In addition to “Representing Text” scaffolding, the instructor employed cognitive scaffolds such as “Explaining” to clarify concepts and ideas. In one

example, she said, “As you may see, as the project size is getting larger, getting wider, the cost escalation is higher. In large size projects, it is really hard to manage costs. Serious cost overruns can be observed in larger projects due to the fact that the complexity and the dynamism of the projects are increasing negatively.” Explaining the details of the concept can help students understand the relationship between two concepts, as in the example. When explained in detail, it can be easier for students to visualize the essential key points cognitively and apply them in real-life scenarios.

Finally, to help students understand the content, the instructor employed translanguaging as a scaffolding strategy. She used Turkish to recruit more interest in the content either at the beginning of a new topic or at the end, and she succeeded in doing so since more students wanted to engage in the content and respond to questions in Turkish. She had to switch to Turkish back and forth at times to get responses from students. In one conversation, she said, “this is a correction waste. People will lose time. Also, people are not sure if the automobile that they bought is safe. Düşünsenize işte milyonlar verip araba alıyorsunuz ve firma geri çağırıyor. Bir de fren sisteminde hata var. baya ciddi bir problem. (*Imagine, you spend millions to buy a car, and then the company recalls it. And there's an error in the brake system. It's quite a serious problem*.)” In this conversation, the instructor started in English and then switched to Turkish to attract more interest by asking students to imagine a car problem, which is an interesting topic for university students. This translanguaging also helped students comprehend the content better. Additionally, the instructor sometimes employed translanguaging to explain a key concept and its Turkish jargon equivalent since students will be civil engineers and they will need Turkish jargon in their future profession. In one example, she said, “lean construction’da yani yalın inşaatta, yalın diye çeviriyoruz Türkçesini. Normalde lean

yaslanmak ama yalın diye çevrilen bir terim. Yalın inşaat yani Türkçesi. Biz yalın inşaatta şunu istiyoruz arkadaşlar hiçbir zaman stok yapılmamasını. Stok yaptığını ürünün fiyatı eski gibi olmayabilir. (*In lean construction, in Yalın İnşaat, we translate it as 'yalın inşaat' in Turkish. Normally 'lean' means to bend, but in this context, it's translated as 'yalın.' In lean construction, we want to avoid stockpiling products at any time, friends. The price of a stockpiled product may not be the same as before*)".

In another conversation, the instructor asked a question in English, and one student responded with a word in Turkish. The instructor continued in Turkish as feedback and then explained the concept first in English and then in Turkish:

T: "Agile construction. Any ideas what the agile is? What is agile construction?

S: Çeviklik (*agility*)

T: Çevik evet ne demek? (*agility, yes, what does it mean?*)

S: Tam bilmiyorum. (*I don't know*.)

T: Agility in construction means to responding to changes faster, reacting to changes faster, adapting to changes faster. Önceden öngörüp ona karşı strateji geliştirmek ve değişikliklere zamanında cevap verebilmek çeviklik olarak adlandırılıyor (*Anticipating in advance, developing strategies accordingly and being able to respond to changes in a timely manner is called agility*).

These translanguaging strategies can scaffold and motivate students to participate in their most comfortable language. By providing scaffolding in both Turkish and English, the instructor tried to engage students and help them comprehend the content effectively.

Regarding assessment scaffolding, the instructor did not employ "Questioning" to assess comprehension. The questioning was used mostly to recruit

interest before starting a new topic during the lecture. Sometimes, the instructor asked students, “Any comments? Ideas? Things to add?”; however, these statements were not aimed at assessing comprehension. Accordingly, “Feeding Back” was not a common scaffolding in these observed courses. The same was true for metacognitive scaffolding. The instructor sometimes utilized “Marking Critical Features” only to highlight key concepts during the lectures. She emphasized important characteristics of traditional construction and lean construction to help students understand the differences better.

To sum up, the EMI instructor in the civil engineering classes observed employed various scaffolding techniques to enhance student learning in the construction management course. Affective scaffolds, including “recruitment,” were commonly used to engage students through real-life examples and questioning. The instructor did not employ conceptual scaffolds such as “Bridging” and “Contextualizing” to warm up students at the beginning of the lesson, but they were used to help students understand key concepts. Cognitive scaffolds like “Reduction in Degrees of Freedom” were also employed for content comprehension. Additionally, translanguaging strategies were utilized as a cognitive scaffold to enhance comprehension. On the other hand, scaffolds for assessment and metacognitive purposes were not commonly utilized during the lesson. Although the strategies aimed to support student comprehension and engagement in the construction management courses, the interaction between the instructor and the students was not very strong in English and only slightly better in Turkish; therefore, more interactive and collaborative scaffolds could be integrated.

When the interaction patterns were analyzed, the Initiation-Response-Feedback (IRF) pattern was not common in construction management classes for

civil engineering students. Consequently, the pattern of turn-taking was limited and was based mostly on monologue rather than dialogue. In one example,

T: So, if you talk about a construction complexity, why do you think the construction projects are complex? Why? Yani neden inşaat projeleri karmaşık diyoruz? (*So, why do we say construction projects are complex?*)

S: Hocam multidisipliner sistem olduğum için (*Because it's a multidisciplinary system, professor.*)

T: Yes, there are different team players. What else?

S: Çok fazla etken var (*There are too many factors*).

T: Yes, the geography, locations are changing every time. Teams are dynamic. So, they are complex in nature.

In this conversation, the Initiate-Response-Feedback-Initiate-Response-Scaffold turn-taking exchange pattern was used, primarily supported by translanguaging, as detailed below:

Initiate is an open-ended question of the instructor to start the discussion on why construction projects are complex, which was followed by a translanguaging scaffolding.

Response is the student response related to the multidisciplinary nature of construction projects.

Feedback is the instructor's response with "Yes, there are different team players.", which affirms the student response.

Initiate is the instructor's follow-up question with "What else?"

Response is the student's response to the follow-up question.

Scaffold is the clarifying the student's response, adding more examples to enhance comprehension.

The instructor in such conversations aimed to foster discussion by asking open-ended questions, but students often gave brief responses, limiting further turn-taking. Despite this, the instructor continued with follow-up questions to encourage more interaction. The instructor's persistence contributed to a more engaging classroom atmosphere, and detailed explanations were eventually provided to ensure clear understanding.

In a similar example, the instructor started the conversation in English and then had to switch to Turkish to start interaction:

T: So, what's a claim? construction claim? Any definition by you? Have you ever heard of a construction claim? What is it?

S: …… (No response)

T: No ideas? What happens when a claim arises in a construction project? What happens? Is it a good or bad thing?

S: …… (No response)

T: Please respond my questions. What happens when a claim arises in a project? Ne demek claim? Hiç duymadınız mı? (*What does 'claim' mean? Have you never heard of it?*)

S: Teklif mi hocam? (*Is it an offer, professor?*)

T: Hayır claim hak, talep demek. claim çıkıyorsa bir inşaat projesinde bu iyi bir şey mi kötü bir şey mi? (*No, 'claim' means right or demand. If a claim arises in a construction project, is this a good thing or a bad thing?*)

S: Kötü bir şey. (*It's a bad thing*.)

T: Neden kötü bir şey? (*Why is it a bad thing?*)

S: …… (No response)

The pattern in this conversation can be described as Initiate-Initiate-Initiate-Response-Feedback-Initiate-Response-Initiate, and can be explained below:

Initiate is the instructor's open-ended question about a construction claim.

Initiate is the instructor's further question to elicit a response after getting no response from students.

Initiate is the instructor's question for the meaning of "claim" after getting no response from students again.

Response is a student's incorrect guess, thinking it might mean "offer." in Turkish.

Feedback is the instructor's clarification of "claim" in Turkish and asking whether it is a good or bad thing in construction projects.

Response is a student's response that it is a bad thing.

Initiate is the instructor's further elaboration on why it is a bad thing.

Despite the instructor's repeated attempts to initiate discussion, she received no responses from the students in this conversation. The feedback, scaffolding and translanguaging practices did not make the conversation more interactive. The instructor made multiple attempts to create a discussion setting in the classroom, but the students remained unwilling to participate. The instructor might have benefited from allowing more wait time for student responses or employing different scaffolding strategies. A similar exchange pattern was observed in another example:

T: There are sources of claims. What do you think might be the source of claims? Yani claimler neden oluşur sizce inşaat projelerinde? (*Why do claims arise in construction projects?*)

S: ……. (No response)

T: Why do we have claims? Ok?

S: Gecikmeler yüzünden. (*due to delays*)

T: Yes, of course. Delays can be the output of the claims, as well. Yes delays, cost related problems. What else? Site problems. Many problems can lead to claims.

S: ……. (No response)

In this conversation, Initiate-Initiate-Response-Feedback-Response pattern was observed:

Initiate is the instructor's open-ended question about the sources of claims in construction projects.

Initiate is the instructor's simplification to the question to get a response.

Response is a student's short response.

Feedback is the instructor's feedback to the student's response

Scaffold is the instructor's expansion on the student response.

Finally, there were instances where students initiated the conversation. In one example, a student sitting in the front row asked a conceptual question in English about project size:

S: How do we define project size?

T: How do we define project size? Well, it depends but for example this is a criteria that we define separately for countries.

S: What are the parameters?

T: Yes, the parameters are effective in previous projects. By looking at the project portfolio based on the past experiences. But we have to consider that one million dollars might not be a large project in France, for example. This is valid for Turkey.

In this turn-taking pattern, Initiate-Response-Initiate-Response-Scaffold was followed:

Initiate is a student's question about project size.

Response is the instructor’s response on project size in various countries and contexts.

Initiate is the student’s further clarification the parameters to define project size.

Response is the instructor’s additional information on parameters.

Scaffold is the instructor’s specific examples (France and Turkey) to illustrate the point.

Asking for clarification by students is not a common practice in EMI courses, but it should be encouraged by instructors since it can aid students' comprehension significantly. Scaffolding clarified student’s request following the instructor’s response.

In conclusion, the discourse analysis of construction management courses for civil engineering students revealed a range of scaffolding practices, but these did not lead to increased classroom interaction. The students generally remained silent and disengaged despite the instructor's multiple attempts. Although various scaffolds might have facilitated content comprehension, the strategies used did not effectively engage the students. Employing additional scaffolding techniques such as “Direction Maintenance,” “Modeling,” “Feeding Back,” and “Developing Metacognition” could be beneficial. Additionally, incorporating “wait time” after open-ended conceptual questions might encourage greater student participation. Consequently, while the observed scaffolds supported comprehension, they did not enhance interaction between the instructor and the students. This could have happened due to the classroom design or the classroom setting since it was in a lecture hall and students were seated like in theater style.

4.4.5 Computer engineering department

In the Computer Engineering Department, the Circuit and Electronics course for sophomore students was recorded three times during one semester. The Circuit and Electronics course was designed as a compulsory course for students and the classroom had approximately 80 students enrolled. This EMI course was also conducted in a lecture hall with a theater style seating. Nearly all seats were occupied and the atmosphere was similar to a typical classroom setting since students were in a tiered seating arrangement and each student was able to see the instructor without being obstructed. As the Computer Engineering Department is 100% EMI department, this compulsory course was also delivered in English.

This course primarily focused on teaching students how to solve circuit current calculations. The instructor first demonstrated these calculations on the projector, explaining the steps clearly, and then completed exercises on various circuit analyses. As a result, students were exposed to numerous circuit diagrams, approximately thirty in a single class session. Consequently, the course content and its structure did not encourage classroom interaction, leading to fewer turn-taking exchanges in the observed interactions. While the instruction was mainly conducted in English, the instructor occasionally switched to Turkish to make jokes.

According to the new framework for this study, the EMI instructor used "Bridging" scaffolding as a warm-up to help students transition to new content by connecting it to prior knowledge. The instructor began by summarizing the previously taught material. He said, “during the last four hours of this course, we were working on some of the nicest things about circuit analysis. It was two of them. Nodal analysis and Mesh analysis. Both of them were great tools”. Following this

introduction, he revisited the details of these analyses and asked questions to spark student interest, a strategy that can be categorized as a "Recruitment" scaffold:

T: But where are we gonna use them? Whenever gonna use them? How in the world we are gonna switch between them? How are we gonna decide on them?"

S: …… (No response)

T: That calls for a quiz but anyway I am not going to do quiz today.

In this conversation, the instructor attempted to engage students by posing critical questions about concepts covered in the previous class. Although practical questions on Nodal analysis and Mesh analysis were introduced to activate students' prior knowledge, the lack of response may suggest that students needed more time to revise and fully comprehend the previously taught material.

To help students understand better, the instructor frequently used examples to make Nodal and Mesh analysis more concrete and accessible. These examples were projected on the board and they served as "Representing Text" scaffolds since the content was presented through various representations. He also explained the exercise details to clarify concepts while demonstrating the steps on the board. The solution of a drill exercise was presented step by step by the instructor and this enabled students to replicate the process later. Additionally, he employed "Reduction in Degrees of Freedom" scaffolding by copying and drawing the circuit steps on the board. Also, the instructor explained the justification behind each step through "modeling" scaffolding while pointing out to the relevant part of the circuit. However, he did not allow students to perform similar drawings on their own. Regarding assessment scaffolding, questioning to check comprehension was frequently utilized. In one conversation, the instructor asked a question to assess understanding:

T: Any problems up to here? …… Go ahead.

S: Can we do the last part for this example like you have the actual solution but what do you do to get to the actual solution?

T: Yes, we can. That's what we are going to do next. (showing the next slide)

In this conversation, a student asked the next step in the solution which suggests that students were actively listening, and the scaffolds employed helped them stay focused on the lesson. Therefore, utilizing "modeling" scaffolds can enhance students' understanding of the concept, as the instructor not only demonstrated the steps but also explained the reasoning behind them. This approach, combined with questioning scaffolds, ensured that students comprehended the material effectively.

"Questioning" to assess understanding was used in the previous conversation and it was occasionally repeated throughout the course. For example, the instructor asked, "How am I going? Too fast?" and one of the students responded, "Can you repeat the last part? Circuit B." Asking such questions can be regarded as "Direction Maintenance" scaffolds, as the instructor not only checks his students' comprehension but also helps them remain cognitively focused on the content.

When the instructor used "Direction Maintenance" scaffolding, it also served as metacognitive scaffolding. In one instance, he said, "By the way, I gotta remind this all over and over and over. I am not the one to solve the problems for you. I am here just to show you how to solve the problems. Solving the problems, doing the examples are all upon you. You are responsible for that. I am here just to show you the way." This can be categorized as both "Developing Metacognition" scaffolding and "Direction Maintenance" scaffolding. In another example, he said, "What we have seen up to here, on some occasions, on nearly all occasions, it does kinda easier

for us to divide the circuit into parts and represent them in a simplified manner since we were not interested in that part of the circuit. Maybe we can just kinda represent them in a simple way. I am trying to write the whole thing as a simplified version". In both examples, the instructor aimed to capture student attention while supporting them metacognitively.

Similarly, in the following example, the instructor employed “Direction Maintenance” scaffolding. He said, “this is much more easier. I can even go back and do another source transformation here” ….. ”beautiful, much more easier to follow, much more easier to solve”. The instructor emphasized the ease of the analysis to attract more attention and supported students metacognitively by promoting self-awareness in problem-solving.

Finally, he used “Making Critical Features” scaffolding to develop metacognition. He said, “If you are asked to find but on practical places when you just working with the problems you don't have to follow any of them. You can see this. Finding TH by just disabling the sources, it's very easy that way. Find TH that way to find the value of the voltage source. You can do Nodal analysis, Mesh analysis whichever you want but at the end you gotta end up with the voltage source in service with resistance or current source in parallel with a voltage sources. Let’s just use the knowledge we just learned. Disable the independent sources” ….. “See? Finding the Rth is as simple as this calculating the resistance of this circuitry. These two are in parallel, the whole thing is in parallel.” The instructor advised students to choose one of the analysis methods and encouraged them to apply the knowledge taught in class. Through “Making Critical Features” scaffolding, he highlighted key concepts for the analysis. By combining both cognitive and metacognitive scaffolds, the circuit analysis was simplified for the students.

To sum up, the EMI instructor in the Computer Engineering classes observed employed several scaffolding techniques in their Circuit and Electronics course. The instructor used affective scaffolds such as “Recruitment” to attract student attention through questions, and conceptual scaffolds such as “Bridging” during the warm-up phase. To aid student comprehension, cognitive scaffolds such as “Modeling” “Demonstration” and “Reduction in Degrees of Freedom” were utilized. Additionally, conceptual scaffolding such as “Representing Text” was also employed. On the other hand, assessment was conducted primarily through questioning. “Marking Critical Features” and “Developing Metacognition” were frequently used during the lessons for metacognitive purposes. Despite the variety of scaffolding techniques employed in the Circuit and Electronics course, the lesson lacked an interactive structure, and the scaffolds utilized did not lead to a more interactive lesson.

As a result, the interaction patterns were analyzed, and the Initiation-Response-Feedback (IRF) pattern was not common; the turn-taking pattern was also limited in the Circuit and Electronics course for Computer Engineering students. In one example,

T: What should I do with this one? (the instructor pointed out a part on a graph) if the resistance you see from this portion is just RTH, what happens to the source?

S: ……

T: Short circuit this one, open circuit this one.

In most conversations, no responses could be observed, and thus no IRF turn-taking pattern could be described. However, sometimes the instructor waited longer for student responses:

T: “For my experimental point of view, infinite resistance means ……. (waiting for students to complete)

S: No current!

T: That means …..

S: No current!

T: That A-B portions are not connected anymore. It’s called …..

S: Open circuit

T: Open circuit! When I mention the open circuit voltage across A-B, low current passing through that branch, that means low current through that RTH, if I put a voltmeter across A-B, what am I measuring?

S1: Voltage

S2: Source voltage

T: The source voltage!

When the instructor insisted on more responses, he became more patient and provided additional scaffolding for the students. This time, the turn-taking exchange was longer than before. According to the turn-taking analysis, the Initiate-Response-Feedback-Scaffold patterns can be described and explained as follows:

Initiate is the teacher’s statement and pause for students to complete it, which asks for completion of the sentence.

Response is the student response with “No current!”

Feedback is the teacher’s prompts for further completion.

Response is another student’s response with “No current!”

Scaffold is the teacher’s guiding the students that the A-B portions are not connected.

Response is one student response with “Open circuit.”

Feedback is the teacher's confirmation with "Open circuit" and provides more context and Initiate is the other question for further details "if I put a voltmeter across A-B, what am I measuring?"

Response is one student's response with "Voltage."

Response is another student's detailed response with "Source voltage."

Feedback is the teacher's confirmation of the correct response with "The source voltage!"

In this conversation, the instructor provided feedback for each comment and used scaffolding techniques to help students reach to the correct answer. He then asked another question to guide them toward the desired response. By doing so, the instructor aimed to engage students by breaking down the content into manageable parts. He verified their responses and asked follow-up questions. However, such scaffolded conversations were not very frequent.

Not only did the instructor initiate the conversation, but students also occasionally asked questions during the lecture. In one example, while the instructor was writing calculations on the board and demonstrating the solution step by step, one of the students asked a question:

S: What's the short circuit current in this picture?

T: The short circuit? OK. OK. I get it there. You are just so lucky that this thing is recorded. I short-circuited this too and trying to find the current I short circuit. Having done that, I am not going to calculate it.

S: Ha. Ok.

T: Ok?

S: Good. I see now.

T: I recommend coffee before coming to the class! It's a great mind-opener.

In this conversation, Initiate-Response-Feedback-Initiate-Response-Feedback pattern can be described. The details of the conversation are as below:

Initiate is one student's question about the short circuit current in the picture after teacher explanation.

Response is the teacher explanation of the process they used before, and he told the student that he would not calculate it.

Response is the student's response with "Ha. Ok."

Initiate is the teacher's check for understanding with "OK?"

Response is the student's confirmation with "Good. I see now."

Feedback is the teacher's humorously advice for drinking coffee before coming to class.

The instructor responded to the student's question with an explanation, then checked for comprehension after the student's brief response, and finally ended with a lighthearted comment. Occasionally, students initiated a conversation by asking questions in Turkish. In one example, a student asked for the reasoning behind performing the circuit analysis:

S1: Hocam biz bunu neden yapıyoruz? Amacı anlayamadım. (Teacher, why are we doing this? I didn't understand the purpose.)

S2: What's the point of doing this?

T: What's the point of this? Now I have a circuitry here. Lots of resistances, lots of sources, lots of whatever in here. But I am asked to find the values related to components and instead of dealing with this all mambo Jambo, just simplify that circuitry over there. I am trying to find a simplified way of doing that, which will ease my analysis for the rest of the circuit."

The instructor then explained the linear system by illustrating the relationships on the board with a graph:

T: “That’s align. Align is linear. Linear systems tempt to show this.”

In this conversation, the Initiate-Initiate-Response-Scaffold pattern can be identified, where the student initiates by asking a question, and the instructor responds with an explanation. However, the student does not provide any feedback to the instructor's response. The explanation of the turn-taking pattern is as follows:

Initiate is the first student’s question about the purpose of the activity in Turkish

Initiate is the second student’s question about the point of the activity in English.

Response is the teacher’s response explaining the purpose of simplifying the circuit to ease analysis.

Scaffold is the teacher’s further explanation and illustration of the linear system with a graph.

The instructor employed scaffolding techniques to enhance student comprehension through additional explanations and visual aids after the feedback. These scaffolds included "Explaining" as a cognitive scaffold and "Representing Text" as a conceptual scaffold.

In conclusion, the discourse analysis of the Circuit and Electronics course for Computer Engineering students revealed some use of scaffolding techniques. These included "Bridging" as a conceptual scaffold and "Recruitment" as an affective scaffold during the warm-up portion of the lesson. To aid student comprehension, the instructor employed cognitive scaffolds such as "Modeling", "Demonstration" and "Explaining" along with "Representing Text" as a conceptual scaffold. "Questioning" was used as a cognitive scaffold to assess student understanding while "Marking Critical Features" and "Developing Metacognition" as metacognitive scaffolds were

employed in a limited capacity. Despite these scaffolds, student engagement remained low since students seldom asked questions or participated in teacher-led discussions. However, when the instructor insisted in getting responses, some students tried to answer the questions. As a result, there were longer turn-taking patterns. Therefore, incorporating more scaffolding that fosters dialogue-based interactions, along with the use of the "wait time" technique, could allow students more time to think critically and respond to the instructor's questions. In addition, the classroom design and the number of students in the classroom could have had an impact on the level of interaction between the students and the EMI instructor.

4.4.6 Mechanical Engineering Department

In the Mechanical Engineering Department, the Manufacturing Processes course for junior students was recorded three times during one semester. The Manufacturing Processes course which was conducted in a classroom was designed as a compulsory course for students and the classroom had approximately 45 students enrolled. Nearly all seats were occupied and the instructor was positioned at a higher level compared to a typical classroom setting, so each student was able to see the instructor without being obstructed. As the Mechanical Engineering Department is 100% EMI department, this compulsory course was also delivered in English.

This course predominantly involved instruction through lectures on various material processing methods and their examples. The course was structured around verbal explanations, accompanied by pictures and videos of processes shown on slides. Since the instructor's approach included both teacher and student questions, the lessons were more dialogue-based. These questions often led to more turn-taking

exchange patterns, especially when the instructor waited for correct answers. This highlights the significance of wait time in EMI courses.

According to the new framework created for this study, the EMI instructor employed “Bridging” scaffolding to warm up students to the new content. He said at the beginning of the lesson, “So this week, we are talking about polymer processing techniques and if you remember our main categorization of processes. We talked about solidification-based processes by using certain techniques. You can give them a shape in a mold most of the time and we allow them to solidify.” In another lesson, the instructor employed “Bridging” scaffolding again. To bridge to the new content, he said, “Last week we talked about polymer processing techniques. We talked about general properties of polymers. We talked about the importance of viscosity. We talked about the difference between in general molding and casting.” The instructor's starting with a bridging scaffold shows that the content he is teaching always is connected and builds on previous concepts. Using “Bridging” as a scaffold can help students connect the old content to the new one and develop deeper comprehension.

In addition to “Bridging,” the instructor employed “Schema Building” scaffolding to activate prior knowledge by showing a list of basic manufacturing processes on the board. Such a list helps students focus on the content and see the whole picture so far. At the beginning of the lesson, the instructor spent a great deal of time developing interest in the course. To keep students focused, the instructor introduced the new content by utilizing a “Direction Maintenance” scaffold. He said, “Almost five weeks, we are talking about similar processes but as we mentioned earlier casting and other techniques are commonly used, and molding-based techniques that we will describe are also commonly used manufacturing operations

in many manufactured products." When multiple scaffolds are employed to prepare students for new learning, comprehension and transition can be facilitated.

The instructor used "Contextualizing" scaffolding to connect the content with real-world examples and warm up students. In one example, the instructor showed pictures of everyday items on the slide to help students understand better. He said, "For example, the item that we see over here. Mostly certain types of polymers, cell phones, as significant amount of polymer components or laptops, every electrical item, household items. Look around. Almost everywhere." By contextualizing the content, students were able to visualize products made from polymers and prepare to understand the material and its processes. In another lesson, the instructor used "Contextualizing" scaffolding again to warm students up for the content about injection molding. He said, "so most of the time the toys you played with when you were kids or some of the components that you see over here in the class are mostly made out of injection molding." Contextualizing content through real-life examples and realia helps students conceptually scaffold to understand new material.

Moreover, the instructor frequently utilized affective scaffolding to capture student interest during the warm-up part of the lessons. In one example, he used "Recruitment" scaffolding by discussing the prospective jobs of students as engineers and what they will need in the future. He said, "We know that as engineers, as manufacturing engineers, we have to deal with all those things a lot. We have to know how to produce things. And we will talk about certain properties of these materials that we use in our daily life for certain purposes." This kind of affective scaffolding can motivate students to be more engaged and alert during the course.

During the warm-up part of another lesson, the instructor used a video to introduce the new content and conceptually scaffold students. By utilizing "Representing Text" scaffolding, the instructor exposed students to a variety of representations related to the lecture. Additionally, the instructor explained the details of the video while students were watching. He broke down the content step by step with pauses to aid comprehension, indicating the use of another conceptual scaffolding, "Reduction in Degrees of Freedom."

Several scaffolding techniques were utilized to enhance students' content comprehension by the instructor. One of the most frequently employed scaffolds was "Contextualizing." This also served as "Recruitment" scaffolding since contextualized concepts captured students' interest, making them both conceptual and affective scaffolds. For example, he said, "Polymers, probably you already know, have a lot of lifespans, meaning that they can stay in the environment for a long time. Certain polymers can stay maybe for 500 years, and some of them are dangerous to the environment as well. Now in the oceans, we have some plastic islands, made out of plastic garbage." He then showed pictures of these plastic islands on the slide to attract students' attention.

In another instance, the instructor compared water and honey with thermoplastics in terms of viscosity: "Viscosity is the resistance to shear. We know water has a very good flowing characteristic and can easily take the shape of a container. When we look at honey, it has slightly higher viscosity. Although it also takes the shape of the container, it is harder to mix honey with a spoon or other tools. When we look at thermoplastics, when we melt them, their viscosity is ten to a hundred times higher than honey or a thousand times higher than water, meaning it is very hard to mix them or put them into the desired container."

Additionally, to introduce blow molding, the instructor used "Contextualizing" scaffolding. He said, "Probably you use products made out of blow molding every day, including these bottles. If you watch videos of beverage companies, you will see that this process is very fast and even this brand creates ten thousand or a hundred thousand bottles per day, so the production rate is very high". When the instructor used contextualizing scaffolding, this captured students' attention and eventually students felt more motivated to ask further questions related to the blow molding process.

Furthermore, various scaffolding techniques were employed to aid comprehension by the instructor. He frequently utilized "Representing Text" scaffolding by showing one or two photos or graphs on each slide to help students understand the content and make the lesson more engaging. For example, he used a graph to compare the density differences between metals, ceramics and glasses. In another instance, he displayed a graphic chart on the usage of plastics and their applications and to attract student attention, he said, "Modern plastics became very common after the Second World War".

To introduce another type of molding, he showed a motion picture illustrating how two parts are connected and disconnected. He explained, "So again we have two types of molds. One of them is called a two-plate mold. In the two-plate mold, you can see the part is injected here—the red one. One plate is here, and the other plate is over there."

In the final example, he displayed images of automobile parts on the slide to highlight the plastic components of a car. He noted, "Let's look at an automobile, for example. There are many different parts that were previously made out of metals but are now made out of polymers—bumpers, lighting, dashboards." In addition to

"Representing Text," these examples also served as "Recruitment" and "Reduction in Degrees of Freedom" scaffolding for students.

Apart from "Representing Text," the instructor frequently used "Cognitive Structuring" scaffolding as a cognitive scaffold to aid comprehension. He utilized graphic organizers and charts to help students follow the content easily by showing the logical sequence of information. In one example, although the properties of plastics were mentioned before by the instructor, he also listed them on the slide to help students comprehend the content better. To engage students more cognitively, the instructor also employed "Direction Maintenance" scaffolding to keep students focused on the content. In one instance, the instructor showed a graphic on the highest ocean plastic waste polluters by country and asked students to focus on the country names and numbers. Afterwards, the instructor discussed microplastics and showed photos of foods that may contain microplastics. Such a graph and explanation by the instructor might have helped students maintain focus on the content. To explain the graph, he said, "For example, fishes consume those garbages in the ocean. Those fishes, when we eat them, transfer those plastic garbages that we call microplastics to humans. And many modern diseases may be associated with these microplastics as well. There are a lot of studies".

Another cognitive scaffolding employed by the instructor was code-switching to aid student comprehension. The instructor used Turkish to explain an important word in context during the lecture when students had difficulty understanding. For example, when introducing the usage of plastics with an image of billiard balls, the instructor said, "The story of this patent actually comes from billiard balls. Originally, they were made out of ivory." He then asked, "Do you know what ivory is?" One of the students responded with "fildişi" (*ivory in Turkish*). The instructor

confirmed, “Yes, fildişi.” In another instance, the instructor translated a term because students did not understand it. During the lecture, when a student asked about the meaning of “pros and cons,” the instructor replied, “avantajlar dezavantajlar” (*advantages, disadvantages*).

As for assessment scaffoldings, “Questioning” was frequently employed to assess student comprehension. In one example,

T: Do you remember why do we call molding instead of casting for polymers? What is the difference between polymer shaping processes in terms of melting and pouring them and solidifying?

S: Birincide basınç kullanıyorduk. (*In the first one, we were using pressure*.)

T: So most of the time in casting operations you don’t have to apply an additional force mostly gravity force is enough to push the material inside the cavities. But when we deal with polymers, they have very high viscosity. Viscosity is the resistance to flow. Because of the high viscosity in polymers, they do not easily fill the gaps we have. So to be able to obtain the desired geometry, we have to add additional force, pressure during the processes. So the pressure is the main difference between casting and molding operation.

In this conversation, the instructor asked a question to assess the difference between molding and casting but did not receive a correct response from the students. He then provided a detailed explanation related to the question, which served as “Explaining” and “Feedback” scaffolding for the students. In another example, the instructor asked a comprehension question to assess the difference between molding and casting, which was one of the aims of the course:

T: What’s the difference between molding and casting?

…….. (without waiting much)

During molding operations, polymers are heated as we do heat the metals as well during casting. But polymer on the other hand requires pressure. We have to apply pressure. Why do we have to apply pressure on them?

S1: Maybe they are lightweight.

S2: Viscosity.

T: Viscosity is the right answer. We will describe them in the following slides.

In this conversation, the instructor asked the first question but did not receive a response from the students. After providing an explanation, which served as another form of cognitive scaffolding, the instructor asked a related question. Following this scaffolded question, students began to respond, indicating that they were more focused and responsive after the additional scaffolding.

Metacognitive scaffolds were also commonly used to guide students in the manufacturing processes course. While explaining the content, the instructor frequently employed "Marking Critical Features" scaffolding to highlight key information during the lecture. In one example, the instructor stated, "For most of them, their melting point is not that much high. Compared to metals, they have significantly low melting point. This is actually one of the interesting points. They have very low melting point. It allows us to melt them easily without giving a lot of energy. But at the same time, it kind of limits their usability at elevated temperatures." The instructor not only compared the melting points of metals and polymers but also stressed the important concept related to polymers.

In another instance, he said, "In polymer processing, we have two main components. One of them is temperature. And the other one is pressure. So, pressure temperature selection is critical over here. If you have good temperature but not enough pressure, it means that the material does not have enough viscosity, low

viscosity, and if you don't push it appropriately, it is not going to fill. So, if you have very low pressure, you will have a lot of gaps or voids in the part, and you will have certain problems. That problem is called short shot." This conversation not only includes a detailed explanation but also emphasizes the critical points related to polymer processing.

While transitioning to the main content of the lecture, critical features of the content were marked. For example, the instructor said, "So before moving onto the actual part, it is important to consider the cyclicity and we have to consider appropriate usage of these polymers as well". In another example, he said, "Another important thing that we will cover this week and probably next week is we will see that it is really simple and cheap to give the desired geometry to the polymer. So, this makes the polymer attractive materials for applications". These examples show that the instructor wanted to highlight important points not only during the main lecture but also during the transitions to capture students' attention and emphasize critical points.

To scaffold students metacognitively, the instructor sometimes utilized "Developing Metacognition" scaffolds. In one example, while discussing the results of a homework assignment, the instructor raised awareness about the sources students use for learning. He said, "You probably have learnt from the homework assignment, the difference between thermoplastic and thermoset. By the way, there were a lot of wrong answers for this question. Probably, a lot of people are still using Google to learn things. It is good to learn things from google but google may give you wrong answers many times, ok? Many google pages do not know the difference between thermoplastic and thermoset. That's what I understood from the homework assignments." In another instance of metacognitive scaffolding, the instructor

encouraged students to think more deeply and reflect on the material by asking them to reevaluate and approach the content from a different angle. He said, “We will try to learn those things before moving on that direction, let’s look at these materials from another aspect.” (The instructor shows polymer materials thrown outside as garbage). By providing metacognitive support, the instructor may foster students' critical thinking skills, which can help them understand the content from various perspectives.

To sum up, the EMI instructor in the Manufacturing Processes courses employed a variety of scaffolding techniques. He used conceptual scaffolds like “Bridging”, “Contextualizing” and “Representing Text”, cognitive scaffolds like “Schema Building” and “Direction Maintenance” and an affective scaffolding “Recruitment” during the warm-up part. The instructor repeatedly utilized these scaffolds to capture attention of the students and ensured that students were prepared for the main content. After transitioning to the main content, the lecture was also contextualized. The main content was scaffolded cognitively through techniques like “Reduction in Degrees of Freedom”, “Cognitive Structuring”, “Direction Maintenance”, “Code-switching” and “Representing Text”. Students were assessed via “Questioning”, and they received metacognitive support through the use of “Marking Critical Features” and “Developing Metacognition” scaffolds.

As for the interaction patterns, the Initiation-Response-Feedback (IRF) pattern was more frequently observed, and the turn-taking pattern was extended in the Manufacturing Processes course for mechanical engineering students when the wait-time procedure was implemented after questions were asked. For example, in one conversation, the instructor asked a question in English, but students responded in Turkish. However, the instructor patiently waited for the desired response, using

“Feedback” and “Questioning” scaffolds, which helped students find the correct answer:

T: So what’s the difference between composite and alloy?

S1: Hocam dağılıp dağılmaması. (*Professor, whether it dissolves or not*.)

T: How would you describe homogeneity?

S2: Alaşımlarda metal olması gerekiyor. (*In alloys, there needs to be metal.*)

T: So? We have metal magnetic composites as well, are they alloy?

S: …….

S3: Kompositlerde belirli bir yapıda birleştiriyoruz. Alaşımlarda ise çok önemli değil. (*In composites, we combine them in a specific structure. However, in alloys, that's not so important*.)

S4: Karbon miktarı mı? (*Is it the amount of carbon?*)

T: The homogeneity was a kind of a close answer actually. But not …

S5: Alaşımlar oluştuğu maddelerin ikisi veya üçünün özelliklerini beraber gösteriyorlar. (*Alloys exhibit the properties of two or three of the materials they are composed of together.*)

T: Gösteriyorlar mı? (*Do they exhibit them?*)

S1: Hocam bağlayıcı bir malzeme daha kullanıyoruz komposit malzemeler için.

S6: hocam faz farkı var galiba kompositlerde. Farklı fazlarda. ("*Professor, we use an additional binding material for composite materials. In different phases.*)

T: You are getting there.

S7: Hocam kompositte gözüktüğü içinde çözünmüyor malzemeler. (*Since the materials appear in composite, they do not dissolve.*)

T: Solutions. In alloys, we have a kind of solution. One material is dissolved in another one. So we have a kind of mixing in kind of atomic level. But in composites,

the materials individual materials, the boundaries are actually very clear. When you look at them in microscale, the materials keep its original geometry and original properties on that location.

In this conversation, the turn-taking pattern can be described as Initiate-Response-Initiate-Response-Initiate-Response-Response-Scaffold-Response-Scaffold-Response-Response-Feedback-Response-Scaffold (IRIRIRRSRSRRFRS). Such an extended turn-taking pattern occurred thanks to the instructor's use of feedback, scaffolds like “Giving of Hints” and “Code-switching” along with the implementation of the wait-time procedure. If the instructor had not scaffolded his students, this extended turn-taking would not have been possible. Though the instructor primarily spoke in English, he allowed students to respond in Turkish, which also encouraged greater participation and engagement with the questions.

In another conversation, turn-taking pattern can be described as Initiate-Response-Initiate-Response-Initiate-Response-Feedback-Response-Feedback-Initiate-Response-Response-Feedback-Initiate-Response-Feedback-Scaffold (IRIRIRFRFIRRFIRFS):

T: depending on the product geometries, depending on the number of the products we want to create, we will have bunch of different polymer processing techniques. For example, do we know how do we create these kinds of bottles? (showing the plastic bottle in his hand)

S1: Yes.

T: What’s the process?

S1: Dökülüyor ve hava ile şişirilip kalıp kapatılıyor. (*It’s poured and then inflated with air, and the mold is closed*.)

T: Anyone who knows the name of the process?

S2: Injection.

T: No.

S3: Blowing?

T: Blow molding. How about the bag over there? On the hanger, the plastic bag?

S: Kalıba dükülüyordur bence. (*I think it's poured into a mold*.)

S2: Blowing.

T: No exactly. How about those plastic covers that we see on the projector?

S: Injection molding.

T: Probably injection molding. So depending on the number of the product we wanted to create and depending on the features of the geometry has, we have different molding techniques. And each technique has certain benefits and certain limitations as well.

This conversation demonstrates that with proper initiation, follow-up questions and feedback, instructors can foster interactive turn-taking patterns with their students. However, in some instances, the instructor did not allow sufficient wait time for students, resulting in a lack of student responses. For example,

T: "So what happens when we try to increase the temperature of thermoplastic?

S: ……. (without waiting)

T: When we increase the temperature of them (showing the plastic water bottle in his hand), they start to become softer and softer."

This short conversation did not continue as the instructor neither provided additional wait time nor scaffolded the students. In contrast, in another example, when the instructor asked a question on thermoplastics, the conversation evolved into a longer turn-taking exchange, due to the instructor's scaffolding.

T: Anyway, can someone tell me what thermoplastic is?

S1: Yes, thermoplastic is a subclass of polymer, and they can easily shape even they heated and solidified.

T: Why do you call even?

S1: Because we have already another class called thermoset. They are harder than that shape, thermoplastic.

T: So how can you explain thermoplastic.

S2: Thermoplastikler devamlı olarak ısıtılıp soğutulabiliyor birden fazla thermosetleri, o kısmı anlamadım. Herhalde bir kere ısıtılıp serleştirilebiliyor. (*Thermoplastics can be continuously heated and cooled multiple times, but thermosets—I didn't understand that part. I guess they can be heated and hardened only once.*)

S3: My friend mentioned that thermoplastics are used again when they produce a product, but thermosets are harder plastics.

T: Ok. The fundamentals are actually the structures. When we apply heat to thermoplastics, they turn into liquid and we can put them into mold and allow them to solidify and they can reuse again and again. On the other hand, thermosets, when we try to heat them, they may degrade or they may burn.

S1: so is it impossible to mend and reuse thermosets, or ..

T: it is impossible to mend them and reuse them.

S1: Hocam yani daha zor değil dimi thermoplastiğe göre. (*Professor, it's not harder than thermoplastic, right?*)

T: Zor değil. Impossible. Kimyasal bağları kıramıyorsun. (*Not harder. It's impossible. You can't break the chemical bonds.*)

S3: What happens when we heat them?

T: They can burn. If there is no oxygen in the environment, they degragate.

S4: Asit yardımıyla geri döndürelbilir belki. Çözücüyle. (*Maybe it can be reversed with acid or a solvent.*)

T: No, no. When you use them, probably you will also hard the formula chains as well.

S2: Bir kere ısıttığın zaman zaten bağ oluşuyor ve bir daha geri döndüremiyorsun. (*Once you heat it, the bond forms, and you can't reverse it again*.)

T: Exactly.

S1: Hocam google'da tam olarak yanlış olduğunu söylediğiniz açıklama yazıyor. (*Professor, Google says the exact explanation which you already said was wrong*.)

T: Google yanlış yönlendirebiliyor. (*Google can mislead you*.)

The turn-taking pattern in this interaction can be described as Initiate-Response-Scaffold-Response-Scaffold-Response-Response-Feedback-Initiate-Response-Initiate-Response-Scaffold-Response-Initiate-Response-Response-Feedback-Initiate-Response. In this pattern, the instructor primarily initiated the conversation, but students kept asking questions, which contributed to a longer exchange. The instructor's scaffolding through additional questioning also led to a more interactive discussion.

Furthermore, when the instructor allowed students to respond in the language they preferred, the length of the exchanges was longer. The instructor was flexible by sometimes responding in English and at other times in Turkish, depending on the student's language choice. In one instance, a student asked a question in Turkish, and the instructor responded in English. This was followed by another student asking a question in English as explained below:

S1: Hocam kaç barlardan bahsediyoruz tam olarak?

(*Professor, exactly how many bars are we talking about?*)

T: It depends on the material.

S2: Can you explain again short shot?

T: Short shot is you have enough temperature. You've molten the material. But again if you remember, the main difference between the casting and molding, you have to apply pressure so that the material can fill the gap. If you don't apply pressure, it is not going to fill the cavity. That is called short shot.

Allowing students to speak in their preferred language seemed to promote a more interactive learning environment. For example, in one conversation, a student asked a question about a part in a motion picture in Turkish, and the instructor responded in the same language:

S: Hocam ordaki kesimi nerde yapıyor en alt parçaya ulaştıktan sonra? (*Sir, where does it make the cut after reaching the bottom piece?*)

T: Şimdi iyi takip et. Ayırma yaparken bir anlamda kopartıyor. Kesme değilde orada bir plate orada kalıyor bir plate burada kalıyor. Çekiyorsun çektiğin için ordan kopuyor. (*Now, follow carefully. When separating, in a way, it breaks off. It's not cutting, but one plate stays there, and another plate stays here. You pull it, and because you're pulling, it breaks off from there.*)

S: Zarar vermiyor mu orada parçaya? (*Doesn't it damage the piece there?*)

T: Tasarımı ona göre yapıyorsun. Orada zayıf bölgeler oluşturuyorsun. (*You design it accordingly. You create weak spots there.*)

S: İnce kesiyorsun. (*You cut thin*.)

T: Evet. En zayıf halka. Zincirin en zayıf halkasından kopuyor. Şurdaki boşluklar biraz ince. (pointing to the parts on the board)

(*Yes. The weakest link. It breaks from the weakest link of the chain. These gaps here are a bit thin*.)

S: Anladım. (*I see*.)

T: You use a good design skill. You can do that.

In this exchange, the conversation was initiated by a student and the instructor provided scaffolding for comprehension through explanation. Using scaffolds such as “Explaining” and “Instructing” along with L1 use might have created an atmosphere where students felt encouraged to initiate conversations and ask follow-up questions. Therefore, employing the correct scaffolds can enhance the interactive lesson environment. For example, the instructor utilized “Contextualizing” and “Recruitment” scaffolds. He said, “Probably you use products made out of blow molding every day including these bottles. If you watch videos of beverage companies, you will see that this process is very fast, and you know even this brand may be creating ten thousand or hundred thousand bottles per day. So, production rate is very high.” After these scaffolds, students began to ask more questions related to the blow molding process:

S1: Hocam bir şey sorabilir miyim? Hava yukarıdan geliyor, aşağıdaki malzemeyi veya yandaki malzemeyi aşağıya daha çok itmez mi? (*Professor, can I ask something? The air is coming from above, doesn't it push the material below or to the side down more?*)

S: Hocam hava kullanıyoruz değil mi? (*Professor, we are using air, right?*)

S: Özel bir gazı yok mu? (*Doesn't it have a special gas?*)

S: Hocam alttaki çukurlaşmaya rağmen kalıbı nasıl açıyorlar, şişeye zarar vermiyor mu? (*Professor, despite the indentation below, how do they open the mold, doesn't it damage the bottle?*)

In conclusion, the discourse analysis of the Manufacturing Processes course for Mechanical Engineering students revealed that a variety of scaffolding practices

are used. In addition, the instructor utilized scaffolding and code-switching practices and this seemed to have increased student engagement as students asked more questions in both English and Turkish. However, this engagement depended on the provision of adequate scaffolding and wait time. When these conditions were met, students were more engaged and willing to ask or respond to questions. In such a classroom setting, students also might have felt more secure to respond to questions and engage in discussions.

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter firstly describes the purpose and scope of the study briefly. Followingly, the key findings are summarized from the results chapter, including the student questionnaire, focus group interviews, teacher interviews and video recordings. In addition, the findings were interpreted according to the literature review and discourse analysis framework. Finally, suggestions and future directions are offered for EMI courses.

5.1 The purpose and scope of the study

The purpose of this research is to explore EMI instructors' scaffolding practices and their impact on classroom interactions in EMI courses at a state university in Türkiye. The study first analyzed the types of scaffolding practices employed by EMI instructors in six different departments through video recordings. Additionally, this study examined whether these scaffolding practices led to increased teacher-student interactions and longer turn-taking exchanges in the observed EMI courses. The observed EMI courses were from Business, Chemistry, Physics, Civil Engineering, Computer Engineering and Mechanical Engineering departments. Finally, the perspectives of the observed EMI instructors were gathered through interviews, and the opinions of the EMI students from the observed courses were collected through a questionnaire and focus group interviews with the students who participated in the questionnaire. These multiple sources have provided valuable insights into EMI instructors' scaffolding practices and classroom interactions.

5.2 Key findings of the study

This study explored the scaffolding practices of observed EMI instructors and their impact on classroom interaction. Three main research questions were the focus of this study, and the key findings were summarized for each research question.

5.2.1 Research Question 1

The first research question, What kind of scaffolding strategies do EMI instructors use?, investigated the types of scaffolding strategies employed by EMI instructors in the observed courses. A new framework comprising scaffolding items from three scholars (Van de Pol et al., 2010; Walqui, 2006; Wood et al., 1976) was designed to code scaffolding practices while watching the recordings of the EMI courses and conducting discourse analysis. While creating this new framework, the scaffolding items were categorized based on their potential purposes: warm-up to the topic, transition to the main topic, aiding student comprehension, assessment and guiding students.

In general, the scaffolding strategies EMI instructors tend to use fall into three categories. Most of the scaffoldings provided by EMI instructors were conceptual, cognitive or affective. These findings align with those reported in the literature (Tajeddin et al., 2020; Mahan, 2022). In the warm-up part of the observed EMI courses, the EMI instructors mainly used “Bridging” and “Contextualizing” conceptual scaffolds similar to the findings in Gonulal and Loewen’s study (2018). Most EMI instructors supported their students by connecting new content to previously studied concepts in the previous week. For instance, in an X-ray technology course for physics students, the EMI instructor summarized previously taught content to connect to new concepts.

Additionally, the content during the lectures was supported through "Contextualizing" in some EMI courses. For example, in the Mechanical Engineering Manufacturing Processes course, the instructor employed a variety of contextualizing scaffolds to warm up students for the main content. Similarly, instructors in Li and Zhang's (2022) study amplified content by contextualizing in their classes. On the other hand, contextualizing was utilized during the main content part to help student comprehend the concepts. Instructors who use "Contextualizing" more frequently may also intend to make the content more accessible to their students. For instance, the instructor in the Financial Management course compared market returns between the Türkiye BISS 100 and USA S&P 500. This comparison made the abstract content more comprehensible to students.

Some EMI instructors sometimes employed affective scaffolding through questions to recruit student attention during the warm-up period, but they were limited and could not receive any response from the students. On the other hand, cognitive scaffoldings such as "Direction Maintenance" were sometimes used to keep student attention on the content through warnings, reminders or questions like "are you listening?" and "are you with me?". Additionally, "Recruitment" and "Direction Maintenance" scaffoldings were observed not only in the warm-up part but also in the other parts of the lessons. EMI instructors may have used them to recruit attention and direct student focus cognitively throughout the lesson.

During the transition to the main topic part, "Contextualizing" as a conceptual scaffolding and "Modelling," "Demonstration" and "Instructing" as cognitive scaffoldings were employed. When the instructors explained the thought processes, it was accepted as "Modelling" (Van de Pol et al., 2010; Walqui, 2006), and when the instructors only showed the steps of a task or problem, this was

accepted as “Demonstration” (Wood et al., 1976). Like “Contextualizing” scaffolding, these three cognitive scaffolding practices were not only used during the transitioning part, but also throughout the lesson in varied levels. To illustrate, in the Business course, the instructor explained the meanings of some phrases used in calculations, like “I” equals “coupon”, and demonstrated financial calculations step by step on the board. Similarly, in both Mathematics for Chemists course from Chemistry Department and Circuit and Electronics course from Computer Engineering Department, “Modelling” and “Demonstration” scaffoldings were observed frequently throughout the lesson since the content was based on doing calculations. “Modelling” and “Demonstration” might frequently have been used by the EMI instructors to simplify the content especially for lower-level students (Li & Zhang, 2022).

Additionally, to help students comprehend the content better, EMI instructors employed a variety of scaffolding practices, mostly cognitive and conceptual scaffolding, which is consistent with prior studies (Tajeddin et al., 2020). For instance, out of cognitive scaffoldings “Giving of hints” and “Explaining” scaffoldings which aimed to simplify the content was utilized mostly in the observed business departmental course. In an X-ray technology course for physics students, the EMI instructor amplified the content via “Cognitive structuring” scaffolding and simplified the content via “Reduction in Degrees of Freedom” scaffolding to aid comprehension. In the first scaffolding, the instructors structured the content using organizers, charts or lists on the board or slides in a logical sequence. In the second scaffolding, they usually simplified the tasks to bridge the gap between the students’ level and the content. In EMI courses, simplifying the content may be employed to compensate for lower-level activities (Li & Zhang, 2022). Lastly, “Representing

Text" as a conceptual scaffolding which aimed to amplify the content was frequently utilized to provide a different representation of the same content almost in all EMI courses. According to Li and Zhang (2022), providing students with amplifying scaffoldings can increase their autonomy (Gibbons, 2015). In addition, when more than one scaffolding is employed simultaneously, content can also be amplified (Fernandez-Fontecha et al., 2020). To illustrate, EMI instructors in some courses described the content verbally and used visual aids and different examples to facilitate comprehension of the content. In addition to being a conceptual scaffolding to amplify the content, "Representing Text" scaffolding served as a cognitive scaffolding because it simplified the content complexity. Overall, although cognitive and conceptual scaffoldings were observed in EMI courses, affective scaffoldings such as "Contingency Management/Frustration Control" (Wood et al., 1976) were not noted.

Throughout the EMI courses, code-switching was one of the frequently used scaffoldings by EMI instructors similar to other studies (Başıbek et al., 2014). Code-switching not only eased comprehension as a cognitive scaffolding (Chuang, 2015; Kırkgöz et al., 2023) but might also have served as an affective scaffolding since instructors can manage contingency and control students' frustration (Wood et al., 1976). Therefore, code-switching might have provided a supportive and safe learning atmosphere for students (Jiang et al., 2016). Code-switching also helped when there was a mismatch between what the instructor said and the students comprehended, so it aimed to be an affective scaffolding as well as a cognitive scaffolding (Yuan & Yang, 2023). For example, the EMI instructor in an X-ray Technologies course switched to Turkish to reduce the cognitive load on physics students when they felt confused due to the complexity of the content. Also, in Production Processes course

for Mechanical Engineering students, one of the students was confused about the meaning of the word “ivory”. The instructor explained the meaning to Turkish and then switched back to English. Additionally, instructors in some EMI courses let their students articulate their ideas in both English and Turkish even though the lecture was only in English (Genc et al., 2023). As a result, code-switching was frequently employed in the observed EMI courses when the instructor wanted to clarify concepts to aid comprehension and facilitate student engagement affectively.

In addition to code-switching, translanguaging was present in some EMI courses. Translanguaging also aims to enhance students’ comprehension of content (Chuang 2015; Kırkgöz et al. 2023). During translanguaging, EMI instructors used both English and Turkish interchangeably to explain the same content to students. For example, in Civil Engineering course, the EMI instructor explained the concept of “agile construction” both in English and in Turkish. This translanguaging not only scaffolded student comprehension but also increased student motivation. Since the use of code-switching and translanguaging addressed students’ comprehension problems and enhanced their engagement, they were often employed by EMI instructors.

Of the assessment scaffoldings, the EMI instructors in this study did not employ “Feeding back” scaffolding to provide feedback on performance. Only in one EMI course, the instructor provided positive feedback such as "that's a nice question" or "that's a very good question” to students after their response to encourage more responses, which indeed led to more questions. However, this was rare in observed EMI courses. Secondly, “Questioning” as a scaffolding was used in different quantities and purposes by EMI instructors. For example, in Business courses only concept check questions like “Do you understand? Do you have any questions? Any

questions?" were employed by the instructor, but students rarely responded to these questions. In Chemistry courses, conceptual questions related to the content were utilized; however, there was a limited response to the questions. Similarly, Milne and Garcia (2013) found that EMI instructors mostly used confirmation checks, self-answered questions and display questions in their EMI courses. Students may not be able to answer their instructors' questions because of their low comprehension of the content (Al Zumor et al., 2019; Kim et al., 2014).

In contrast, in the physics course, students were very active when asked questions for assessment based on the previously taught content. In Mechanical Engineering courses, "Questioning" was frequently used to assess comprehension, but sometimes the instructor wanted to ask guessing questions to the students to warm them up. This may suggest that types of "Questioning" and its frequency may change depending on the EMI course. However, "Questioning" can be important since instructors can easily understand whether the students comprehend the content or not when they ask questions (Chin, 2007).

In addition to assessment, "Questioning" was utilized to recruit attention of the students, especially at the beginning of the courses. Therefore, "Questioning" can be categorized as an affective scaffolding as well as a cognitive scaffolding. For instance, in Civil Engineering courses, "Questioning" was employed mostly to recruit students' attention, not for assessment. In Computer Engineering courses, critical "Questioning" was used to engage students with the previous materials and guide students. As a result, "Questioning" was used as a cognitive and affective scaffolding in different EMI courses.

Based on their purpose, the last category of scaffolding was guiding. When EMI instructors provided metacognitive support, they were categorized into this

group. There are three items regarding the Metacognitive scaffoldings: “Marking Critical Features”, “Questioning (For Metacognitive Thinking)” and “Developing Metacognition”. Metacognitive scaffoldings were less frequently employed by EMI instructors in the observed courses than other types of scaffoldings (Mahan, 2022; Tajeddin et al., 2020). Of these metacognitive scaffolding items, “Marking Critical Features” scaffolding was the most frequently used to emphasize key information during the lectures. In almost all the observed EMI courses, the instructors highlighted some aspects of to attract students’ attention. In this manner, “Marking Critical Features” scaffolding can be grouped as cognitive scaffolding similar to “Cognitive Structuring” or “Giving of Hints”. Therefore, EMI instructors might have occasionally used this scaffolding to enhance comprehension rather than to develop metacognition.

On the other hand, “Questioning” for metacognitive thinking and “Developing Metacognition” scaffolding by Walqui (2006) were not observed frequently. However, there were only a few examples. In one example of an X-ray technology course for physics students, the EMI instructor wanted encourage students to engage in independent learning and utilize additional resources from the school library. In the Mathematics for Chemists course, the EMI instructor wanted to develop self-awareness by comparing the Newton-Raphson method with other methods. In the Manufacturing Processes course, the EMI instructor asked students to reapproach the material from another perspective, which might have improved their critical thinking skills. In conclusion, although some EMI instructors are willing to develop metacognitive skills, such cases are rare due to a number of potential reasons such as focusing on content only due to time constraints and lack of training

(Vo, Sarkar, White & Yuriev, 2022). However, instructors should be encouraged to maximize metacognitive awareness (Mannion et al., 2021; Stainer, 2015).

In summary, according to the new framework, the findings showed that EMI instructors primarily employed conceptual, cognitive and affective scaffoldings in varying quantities. Conceptual and cognitive scaffoldings were used for warm-up, transition to the main topic and helping comprehension purposes while affective scaffoldings were used to recruit attention during the warm-up and throughout the lesson although less frequently than other scaffoldings. However, metacognitive scaffoldings were the least commonly used in EMI courses with only a few examples observed.

5.2.2 Research Question 2

The second research question investigated student engagement during lectures, particularly after scaffoldings are provided. Classroom discourse analysis revealed that scaffolding practices varied and their effects on classroom interactions differed. Three types of EMI courses were observed.

In the first type, there were only a few scaffolding practices in classrooms. Having limited scaffoldings might have led to minimum interactions between students and instructors. Similar findings have been reported in other studies (An et al., 2021; Dalton-Puffer, 2007; Doiz & Lasagabaster, 2023; Lin, 2006; Lo & Macaro, 2011; Yip et al., 2007). According to Lo and Macaro (2012), EMI courses usually involve less interactions between instructors and students. This mainly results from monologue-based teacher-centered teaching with limited scaffoldings (An et al., 2021; Lasagabaster & Doiz, 2022; Thompson & Lee, 2014). As a result, fewer or no IRF (Initiate-Response-Feedback) patterns have been observed in these EMI courses

(An et al., 2021). For these EMI courses, it can be concluded that when a limited variety and number of scaffoldings with different purposes are provided, classroom interaction can decrease and a lack of meaningful engagements can occur.

In the second type, a variety of scaffoldings were employed by EMI instructors, ranging from cognitive to conceptual and affective scaffoldings, but there was minimal interaction between the students and the EMI instructor. Incomplete IRF patterns were observed, and extended IRF patterns such as IRFRFRF were rarely observed with limited turn-taking exchanges. Despite various scaffolding practices, lack of interaction, disengagement and minimal turn-taking exchanges in these EMI courses could be due to the course structure such as doing mostly calculation during the course, having a monologue-based lesson plan or not using proper scaffolding practices for their correct purposes or due to time restrictions (Ismailov et al., 2021; Johnson & Picciuolo, 2020). It can be concluded that a greater variety of scaffoldings with different purposes can be used in these EMI courses. For instance, additional scaffolding with different levels can be employed during a warm-up session to recruit student attention (Li & Zhang, 2022). In addition, more interactive and dialogue-based scaffoldings along with follow-up questions can be adopted to enhance interaction in the classroom (An et al., 2021).

In the third type, EMI instructors employed a wider range of scaffoldings. For instance, giving feedback, providing hints and effective code-switching were utilized as well as other cognitive, conceptual and affective scaffoldings. In addition, bridging and contextualizing scaffoldings were provided during the warm-up sessions of EMI courses. EMI students were also metacognitively supported and encouraged to be engaged in these courses. Although Lasagabaster and Doiz (2022) and Thompson and Lee (2014) did not find clear differences among EMI disciplines

in terms of classroom interaction, EMI courses in such learning settings exhibited more interaction and longer interactional turn-taking exchange patterns (Lo, 2013). While some EMI courses occasionally had extended IRF exchange patterns, they were commonly observed in other EMI courses. The reason why extended IRF exchange patterns increased in these EMI courses could be due to having more variety and a greater quantity of scaffoldings for different purposes (Fernandez-Fontecha et al., 2020). Additionally, some instructors responded to students in the language they responded to (Pun & Macaro, 2018); as a result, turn-taking exchanges extended through feedback, code-switching and scaffolding. These EMI instructors also utilized wait time to allow students to think after a question was asked or scaffolding was provided, which helped students engage with their EMI instructors (An & Childs, 2023).

Student involvement during in-class interactions after scaffolding is provided is very critical, and the reasons of increased or decreased student involvement in interactions can be categorized into three areas: scaffolding strategies, classroom environment and the nature of EMI courses. Firstly, student involvement may depend on scaffolding strategies the EMI instructors employ. When the EMI instructors employed multimodal scaffoldings tailored to the needs of the EMI students, it led to more student involvement. Secondly, student involvement in classroom interactions can be enhanced in a supportive EMI classroom environment. In this study, students in focus interviews expressed the fear of making mistakes when speaking in English. Also, less interactive instructor approaches were pronounced to be contributing factors of decreased student involvement by both EMI students and EMI instructors during interviews. Consequently, in EMI courses relied

more on teacher-centered approaches, student involvement in interactions was minimum.

Additionally, classroom setting can impact the classroom environment and thus student involvement in EMI courses. In overcrowded classes, student involvement decreases and EMI students become unwilling to respond to scaffolding practices. In addition to overcrowded classes, the design of classroom can impact the interaction level of EMI students after scaffoldings. For example, a lecture hall with rowed seating which can easily obstruct other students or a large classroom with a few students can lead to reduced student involvement. Finally, the level of student involvement after scaffolding can also depend on the nature of EMI courses. In an EMI course which focused on mathematical calculations mostly, students mainly focused on the content only. In contrast, in an EMI course centered on discussion and critical thinking, student involvement increased, supported by other factors.

All in all, student involvement after scaffolding in EMI courses is characterized not only by EMI students themselves, but also other factors: scaffolding strategies of EMI instructors, classroom environment and the nature of EMI courses.

The students' responsive involvement is also critical while scaffoldings are provided. According to Van de Pol et al. (2010), scaffoldings should not be provided uniformly without assessing the students' responses. The instructors can be more careful about when to increase scaffolding and when to fade scaffolding (Lajoie, 2005). Therefore, the responses of the students to scaffoldings should be taken into consideration while providing additional scaffoldings. Accordingly, scaffoldings can be removed when students do not need them (Sharma & Hannafin, 2007) as the contingency rule of scaffolding makes them effective scaffoldings. When the

scaffoldings provided are higher than the students' comprehension level, or when they do not respond to scaffoldings, the instructor can decrease the level of degrees of freedom (Wood et al.,1976). As a result, the instructors will be helping or cuing their students more when students do not respond. Additionally, when students are responsive to scaffoldings, instructors can increase the level of degrees of freedom so that the responsibility will be transferred to students (Van de Pol, 2010). This is also called the fade of scaffolding.

5.2.3 Research Question 3

The third research question investigated the perspectives of EMI students and EMI instructors on scaffolding practices and teacher-student interaction in the classroom.

Three data sources were used in this study. The first was a student questionnaire on the perspectives of students regarding scaffolding and classroom student-teacher interaction. The students who participated in the questionnaire were junior (40.6%), sophomore (32.3%) and senior students (27.1%). According to the results, although some students were unsure whether scaffolding could increase their participation in the class, most students (91%) believed that scaffolding techniques can positively influence classroom interaction, which suggests that a high number of students are ready to benefit from scaffolding practices. An and Thomas (2021) and Carloni (2018) also found that students are aware of the importance of scaffoldings. Additionally, 65.2% of the students preferred an interactive EMI classroom atmosphere. On the other hand, they were unsure about what an interactive classroom was because they had different perspectives on teacher questions during the lecture. Although most students (70.3%) thought that teacher questions were important for learning and 66.5% preferred to be asked questions in the class, only

half of the students were willing to respond with long sentences to the teacher questions, and the other half preferred to respond quickly with only a yes or no. Given that teacher questions are crucial for increasing interaction (Pun & Macaro, 2018), it is important to ask questions that elicit both long and short responses in EMI courses.

In addition, according to the questionnaire results, most of the students were not willing to participate actively in class discussions (An et al., 2021) although most of them believed that scaffolding could increase participation. This suggests that either scaffolding is not available to activate engagement or that there are other factors that can affect student participation such as language proficiency (Kaur, 2020; Su & Kong, 2023) or self-confidence (Al Zumor, 2019). However, despite being unwilling to participate, 69.1% of the students were ready to ask questions to their EMI instructor when they did not understand the content, which may suggest that students care about the content and they want to ask questions not during the lecture, but after the lecture in one-to-one settings.

Mahan (2022) suggests that there are departmental differences in terms of scaffolding practices. When departmental differences were compared, Physics and Chemistry students had different opinions from Computer Engineering students regarding in-class interaction and scaffolding practices. Physics and Chemistry students rated scaffolding and interaction with the highest point, but Computer Engineering students rated them the lowest. The nature of the departments might have a role here. While Computer Engineering students may need more direct teaching through lectures and practical implementations, Physics and Chemistry students may need more scaffolded lectures. EMI students in natural sciences have fewer interactional exchanges than students in the social sciences. On the other hand,

Lasagabaster and Doiz (2022) found no significant variation in terms of interaction between EMI courses. Also, Peng and Xie (2021) found no difference between soft- and hard-core departmental courses. However, in Lo's (2014) study, the author found differences between Humanities and Science & Math courses. Accordingly, in Humanities courses, more interaction was observed with longer I-R-F exchanges. On the other hand, Science and Math courses had less interaction with fewer I-R-F exchanges. These findings suggest that there can be differences among departmental courses.

The second set of data comes from focus group interviews with students. Six focus group interviews with two students from each department also revealed some interesting insights related to teacher scaffolding and interaction. There were eight questions in the focus interview. The first question focused on what teacher-student interaction meant for them. Responses to this question were their engagement and participation during the lessons, communication with and accessibility to the instructor, good teacher-student relationship, effective and dynamic teaching approach and guidance and motivation of the instructors. In addition, when students were asked to rate the importance of interaction between the instructor and students in the classroom, they gave as 3.83 out of 5, which demonstrates that most of the students take interaction as important, but some students also value individual learning on their own (Vermunt & Vermetten, 2004) with less interaction in the class.

According to focus group interviews with students, some factors can increase classroom interaction. Teacher-student interaction can be increased through the positive qualities of instructors and effective teaching techniques. They would like their instructors to have positive energy, be student-friendly and accessible and avoid

mocking students. Cornelius-White's metanalysis (2007) also demonstrates that these favorable characteristics relate to positive student results. In addition, according to the focus group interview findings, for better interaction, their instructors can ask questions, use different methods and gestures, provide feedback and provide better responses to student questions. These factors are also in line with the findings of other studies (Chickering & Gamson, 1987; Myhill & Dunkin, 2005; Hattie & Timperley, 2007).

On the other hand, for students, classroom interaction decreases when courses are not effectively designed due to overcrowded classrooms and long course durations. Mulryan-Kyne (2010) also pointed out the difficulty of teaching in large EMI classes. For EMI students, there can also be less interaction due to teacher and student factors such as lack of motivation and engagement and being tense or unapproachable and English proficiency problems, which are also supported by the literature (Jensen & Thøgersen, 2011; Kaur, 2020; Patric & Farmer, 2022). Moreover, poor pedagogical approaches such as the passive use of slides, monotonous delivery of content, failure to connect the course material to real-world applications and inability of teachers to adapt to students' varying levels can decrease classroom interaction. These findings are also consistent with the other studies (Arkın & Dikilitaş, 2022; Hu & Lei, 2014; Murdoch, 2021). When asked for personal reasons not to engage during lectures, students emphasized psychological barriers, personal readiness and environmental and external factors, which align with other studies (Guo, He & Wang, 2022; Hua, 2019; Evans & Morrison, 2011).

As an effective strategy to tackle these hindrances, students stated that teachers could improve their instructional pedagogy to promote interaction by utilizing different presentation techniques, real-life examples, warm-ups and group

activities (Marrs & Novak, 2004; Muir, Wang, Trimble, Mainsbridge & Douglas, 2022; Smith, Worsfold, Davies, Fisher & McPhail, 2011; Wanner, 2015). A variety of assessment techniques such as quizzes and alternative grading methods could be integrated to the course. Finally, they can improve their teacher image as instructors through positive impressions and enthusiasm by being proactive and self-marketing.

Related to the scaffolding practices in EMI courses, some students noticed the use of scaffolding practices such as "questioning", "feedback", "modeling" and "explanations", but they noted that scaffoldings vary depending on the instructor. However, some students reported infrequent use of these supportive tools, especially in overcrowded classes (Mulryan-Kyne, 2010). As a concluding thought, students suggested utilizing diverse teaching methods to avoid monotony in teaching, creating a supportive and respectful environment for students and making changes in the course structure such as reducing class size, providing additional participation grades and incorporating small breaks during classes to increase teacher-student interaction.

In conclusion, according to focus group interviews, most of the students believe that interaction in the classroom is important (An & Thomas, 2021; Walsh, 2011), and if mentioned changes and suggestions are made, they can be more engaged in during the lessons, which can help them comprehend the content better (Chuang, 2015).

When the results of the student questionnaires and student focus group interviews were compared, the student questionnaires provided more general ideas related to students' views on interaction whereas in focus group interviews, as expected due to active involvement (Kuter & Yilmaz, 2001), students were more detailed on factors influencing classroom interaction. Regarding student perspectives, the importance of interaction for students was 3.83 out of 5 in focus

group interviews, but it was 4.25 in student questionnaires, which indicates that students express their ideas differently regarding self-learning and interaction in different settings (Kvale, 2007). In addition, the students were more satisfied with the instructional methodology of their instructors in the questionnaires. However, in focus group interviews, they were more critical of the teaching styles of their EMI instructors and suggested a variety of changes for lectures. These discrepancies show that to obtain a complete picture of student perspectives in EMI classes, both quantitative and qualitative data should be collected (Dörnyei, 2007; Kuckartz & Rädiker, 2021).

The third dataset comes from interviews with six EMI instructors. Interviews were conducted with one instructor from the observed classes, and some key findings emerged. According to the findings, classroom interaction is very important in EMI courses. Instructors rated the importance of interaction as 4.5 out of 5. The first question asked lecturers what interaction between students and lecturers mean for them. They defined teacher-student interaction as a supportive class environment, accessible instructors and engaging teaching atmosphere. They believe that student-teacher interaction can facilitate learning and increase the motivation of both students and instructors. These findings are also consistent with the results in the literature (Dang, Bonar & Yao, 2023; Hoang & Tran, 2022).

According to the interviews with the instructors, some dynamics can increase student-teacher interactions in the classroom. These involve engaging teaching methodology, building rapport with students and exposing students to different learning experiences (Frisby & Martin, 2010; Lammers & Gillaspy, 2013; Rose, 2021). However, the instructors stated that interaction might decrease as a result of unengaging teaching approach, such as monotonous teaching, lack of preparation for

the lesson or relying solely on PowerPoint slides and instructor disengagement, such as low motivation and lack of enthusiasm in teaching. Finally, the instructors emphasized that student-related factors such as lack of motivation, mobile devices and being unprepared can lead to less interactivity in the classroom setting.

Additionally, the instructors throughout the interviews provided some examples of strategies they utilize to increase interaction. Some instructors said that they used videos, visuals or real-life examples both to support comprehension and increase interaction, which is implemented in many other EMI courses (Mahan, 2022). Also, some instructors emphasized translanguaging (Yuan & Yang, 2023), using humor in Turkish, putting enthusiastic students at the front row, group work (Macaro et al., 2020), rewarding students or talking about practicality of the course to engage students during the lectures. According to the instructors, when these strategies are used, the instructors notice the improvement in classroom interaction; however, they stated that these strategies should not be provided in a pushing manner but in a supportive way.

As a final comment, the instructors would like to change their course structures in three ways. They would rather have more engaging and interactive teaching settings, sometimes use Turkish to combat language challenges for students and incorporate student-centered approaches such as hands-on activities and practical applications. In line with other researchers' findings (An & Thomas, 2021; Fletcher, 2015), these insights related to classroom interaction show that instructors would like to have an interactive teaching setting as they emphasized the importance of classroom interaction, and they have already mentioned some suggestions and strategies to increase the student-teacher interaction.

When the findings of the student focus interviews and teacher interviews were compared, some differences came out. Firstly, interaction was rated higher by the EMI instructors. However, although EMI instructors expressed the use of supportive strategies to engage students, students highlighted that interaction varies among the instructors, and EMI courses usually lack student-teacher interactions, leading to monotonous, teacher-centered lesson (Dalton-Puffer, 2007; Lin, 2006; Lo & Macaro, 2011). Moreover, students emphasized the need to use native language more to support comprehension compared to the EMI instructors. These gaps between the perceptions of the instructors and the students can reveal the need for both parties to reassess their expectations from each other at the beginning of the course. When these discrepancies are addressed, both students and EMI instructors can have a more collaborative and inclusive learning atmosphere (Lai, 2022).

Overall, the key findings suggest that there are differences between student questionnaire results and student focus interviews as well as between teacher interviews and the classroom discourse analysis of the EMI courses recordings. Triangulating data from four types of data confirmed that utilizing scaffolding is important and necessary although scaffolding practices were not commonly used. However, when scaffolding practices were employed in greater quantities (Banegas & Manzur Busleimán, 2021; Fernandez-Fontecha et al., 2020; Puntambekar & Hubscher, 2005; Tajeddin & Kamali, 2020), with the correct use and methodology, they led to extended turn-taking and interactional exchanges. It can be concluded that different departmental EMI courses require different scaffoldings practices.

5.3 Implications

Several implications can be drawn from the key findings. First of all, although some studies present contradictory results in the literature (Lasagabaster & Doiz, 2022; Lo, 2014; Mahan, 2022; Peng & Xie, 2021), the key findings demonstrate that scaffolding practices vary and the level of student teacher interaction may depend on a number of factors such as effective scaffolding practices and a supportive learning atmosphere and the classroom setting.

In the EMI courses with less interaction, EMI instructors can adopt various scaffolding practices which are suitable for their disciplines. Instructors can especially provide metacognitive scaffoldings along with cognitive and conceptual scaffoldings to increase classroom interaction. Secondly, EMI students may still be unwilling to participate in the discussions or ask questions during the lecture despite the provision of scaffoldings. In such cases, EMI instructors can first assess the comprehension and proficiency level of their students before applying scaffolding practices and be aware of their linguistic abilities to understand their comprehension level (Tabak, 2004). In this way, they can utilize more tailor-made scaffoldings, which can also boost student confidence. Ideally, this support should be faded gradually and the responsibility of the discussion can be transferred from instructors to students (Van de Pol et al., 2010). To effectively scaffold students, EMI instructors can get training on effective scaffolding strategies and how they can enhance classroom interaction (Morell, 2020). Some instructors may not know how to increase interaction in their classes although EMI instructors are well aware of the importance of classroom interaction. In addition to lack of proper scaffolding practices, factors related to classroom design seems to decrease classroom interactions between EMI students and EMI instructors. Some EMI courses have

overcrowding and long lecturing problems, and these classroom dynamics can decrease classroom interaction. Therefore, EMI courses can be designed in shorter time periods and to allow fewer students to register.

Another important implication that can be inferred from the findings is the strategic use of native language of the EMI students during the lectures. EMI instructors should not refrain from employing code-switching and translanguaging strategies to enhance comprehension of complex contents and increase classroom interaction. According to the findings, students participate more when they are allowed to respond in their native language while discussing the content in English. This approach can increase their self-confidence and create a more inclusive and multilingual learning setting (Blair, Haneda & Bose, 2018).

For an interactive EMI course, EMI students and EMI instructors marked that different teaching methods can be employed such as explaining with real-world examples, integrating videos and some other tools. EMI instructors can adopt multimodality as a teaching strategy to support their students (Lai, 2022). They can provide multi-modal input to vary the content to be presented to their students through visuals, audios, applied activities, real-life activities and technological tools.

The findings from students and instructor interviews also reveal that characteristics of an EMI instructor play an important role for creating an interactive classroom atmosphere. Being approachable both in and out of the classroom as well as being enthusiastic, positive and prepared were the most pronounced features of an EMI instructor to enhance classroom interaction. In addition, instructors can give timely feedback and answer student questions promptly to keep students engaged.

Finally, the findings suggest that the expectations of EMI students and EMI instructors can differ from each other in terms of the level of interaction and the use

of scaffoldings. EMI instructors can pronounce their expectations clearly about classroom interaction at the beginning of the semesters. This will help students understand their EMI instructor's expectations and adjust their motivation and requirements towards their instructor's classroom expectations. When students understand what is expected from them regarding classroom interaction clearly, the rate of engagement can increase day by day through mutual collaboration.

5.4 Suggestions for EMI courses

Although classroom interaction is important for student success (Robinson & Hullinger, 2008; Walsh, 2011) and this is acknowledged by both students and EMI instructors (An & Thomas, 2021), studies show that EMI courses often lack an interactive learning atmosphere (An et al., 2021; Dalton-Puffer, 2007; Lin, 2006; Lo & Macaro, 2011; Yip et al., 2007). To address interaction problems in EMI courses, some suggestions found in literature as well as the ones identified in this study can be implemented in EMI courses in higher education institutions.

For EMI courses, Evans and Morrison (2011) suggest that students come to class prepared to overcome their limited English proficiency in EMI courses. In addition, students can pre-learn the academic words needed for their studies (Yıldız et al.,2017) because vocabulary knowledge of EMI students plays an important role in their success in EMI courses to address linguistic challenges in EMI courses (Masrai et al.,2022). Therefore, EMI programs can include active vocabulary improvement strategies to support EMI students through ESP courses (Rose et al., 2019; Thompson et al., 2019; Xie and Curle, 2020).

In addition to ESP courses, EMI courses can also support EMI students psychologically. Research shows that EMI students with a growth mindset for

language learning perform better than the ones with a fixed mindset (Kaya et al., 2022). Therefore, it is possible to foster EMI students' mind related language learning. A positive attitude toward language learning might help them be self-confident for their EMI courses (Mercer, 2008).

Another student-centered pedagogy that can help prepare students for EMI courses is the Flipped Learning Model. In their systematic review, Akçayır and Akçayır (2018) concluded that student performance improves in a flipped learning setting. Since the performance of the EMI students is critical for their engagement, the Flipped Learning Model can be applied in EMI courses. Choi et al. (2015) reported that Flipped Learning Model was applied in an EMI nursing course and it enhanced content comprehension. The students participating in the study also supported the use of this model because they were able to watch the recorded videos before coming to class. By adopting the Flipped Learning Model, EMI students can also come to the classroom prepared and ready to engage in discussions.

Additionally, EMI courses can integrate EMI students' first language since it can increase students' engagement in classroom discussion (Ataş, 2023). In this study, when students were allowed to respond in their native language, they were more likely to engage with their instructor's questions. According to Tai and Wei (2020), EMI students can express their opinions on the content through translanguaging practices. Furthermore, Curle et al. (2020) suggest that integrating some courses in EMI students' first language into the EMI programs can increase their success in EMI courses. The importance of using the first language of EMI students for different purposes such as supporting comprehension, building rapport and increasing interaction were also underlined by other researchers (Breeze &

Roothooft, 2021; Kırkgöz et al., 2023; Genc et al., 2023; Macaro et al., 2020; Yuan & Yang, 2023).

Moreover, EMI courses can be enriched by incorporating more student-centered practices. For instance, instead of asking display, confirmation or self-answered questions (Dafouz Milne & Garcia, 2013), Pun and Macaro (2018) suggest employing higher order questions based on Bloom's Taxonomy such as Analyze, Evaluate, and Create questions to enhance classroom interaction. To enhance student engagement and classroom interaction, these teacher questions can be accompanied by "wait time" procedures. When EMI instructors allow sufficient "wait time" for their students after asking a question, students' engagement with the questions can increase (An & Childs, 2023; Querol-Julián, 2023). By combining higher order questions and wait time, EMI instructors can create a more engaging learning atmosphere for their students.

Additionally, EMI instructors can employ more meta-discourse markers such as "first", "second", "therefore" and "however" to aid comprehension during EMI courses (Aykut-Kolay & İnan-Karagül, 2024; Carloni, 2018; Doiz & Lasagabaster, 2022). Also, EMI instructors can utilize practices like repetition, rephrasing and enhancement techniques such as circling, coloring and underlying (Jiang et al., 2016). Besides, to prevent any comprehension problems among EMI students, "introducing", "defining", "listing", "eliciting", "giving examples", and "emphasizing" strategies can be adopted (Tsai & Tsou, 2015). These approaches can help EMI students understand the content better, which in return will hopefully boost their engagement.

The final student-centered practice that can enhance EMI courses is using multimodal input during lectures. EMI students can be supported by audial and

visual input to aid comprehension and increase classroom interaction through multimodal input enhancements such as videos, real-life realia, case studies and more engaging technology-based presentations (Fernandez-Fontecha et al., 2020; Lai, 2022; Norte & Morell, 2024). This multimodality can be achieved through the use of a variety of scaffoldings (Puntambekar & Hubscher, 2005). When EMI courses include amplifying scaffoldings rather than simplifying ones, they can support EMI students with more cognitive materials (Gibbons, 2015). In addition to amplifying scaffoldings, metacognitive scaffoldings, which are rare in EMI courses (Mahan, 2022; Tajeddin et al., 2020), can be used more frequently to increase students' awareness for their own learning (Mannion et al., 2021; Stainer, 2015).

5.5 Limitations of the study and future directions

The first limitation of the study is its focus on only available EMI courses. As a result, the findings of this study may not fully be generalized to represent broader EMI contexts. Compulsory EMI disciplinary courses were recorded; however, elective EMI courses could have been observed and compared. According to Macaro (2022), differentiation might be drawn between EMI disciplines. This study was conducted in a state EMI technical university setting, and EMI courses were mostly hard-core EMI disciplines (Macaro, 2022) such as physics and engineering. Consequently, it is possible to argue that the dataset is insufficient to apply the results to all EMI higher education institutions. Comparing EMI students who study in different EMI contexts with similar profiles can provide a broader picture regarding scaffolding practices and classroom interaction in EMI courses. Therefore, researchers in future can include larger samples from different courses and institutions to enhance generalizability. However, the results can be applicable to

contexts in which university students can study hard-core EMI disciplines around the world. However, future studies should focus on comparing hard-core discipline-centered EMI settings with soft-core discipline-centered EMI settings.

Also, the number of lecturers observed in each discipline remains to be a limitation for this study. Although EMI classes were scheduled to be observed four times per semester, only one lecturer's class from each discipline was observed and video recorded. More lecturers with varying experiences in the same discipline could have been observed and video recorded, which could have resulted in more generalizable findings. In future studies, more EMI lecturers can be observed and compared based on their experience in EMI courses.

Additionally, this study may be limited due to observing the same students in only one EMI course. Observing the same students in other EMI courses could have helped to see whether the EMI instructor is a contributing factor. Furthermore, these students could have been observed not in one semester, but across semesters. Longitudinal research in future studies can provide more detailed insights into how scaffolding practices can influence classroom interaction over semesters.

Another limitation of the study is not taking the proficiency levels of the EMI students into account. Although the EMI students in this study had passed the proficiency examination of the preparatory school of the university, their actual proficiency level may vary. Therefore, different levels of the EMI students may impact their interaction level after a scaffolding is provided. Future studies can include the proficiency level of EMI students in their research.

The final limitation of the study is not addressing the pedagogical trainings of the EMI instructors. Some EMI instructors might have received training on supporting their students while others may not. Future studies can interview EMI

instructors to learn their professional development background as such trainings can influence their in-class practices. Also, before the interviews, future studies can adopt sharing interview questions for focus interviews with students and teacher interviews as this may enhance participant engagement during interviews (Haukås & Tishakov, 2024).

5.6 Conclusion

This study has demonstrated that scaffolding practices are important and acknowledged as beneficial by both EMI students and EMI instructors. However, the discourse analysis showed that scaffolding practices vary significantly in different EMI courses. In addition, by analyzing Initiation-Response-Feedback (IRF) patterns and turn-taking exchanges following scaffolding practices, this study has examined how these practices had an impact on interaction between students and EMI instructors. As a result, it has concluded that effective scaffolding practices can extend IRF patterns such as IRFRFRF as observed through classroom discourse analysis.

This study shows that effective multimodal scaffoldings can meaningfully enhance classroom interaction between EMI students and their instructors, which then leads to extended turn-taking exchanges with longer IRF patterns.

APPENDIX A

TÜBİTAK GRANT APPROVAL LETTER

T.C.
TÜRKİYE BİLİMSEL VE TEKNOLOJİK ARAŞTIRMA KURUMU BAŞKANLIĞI
Araştırma Destek Programları Başkanlığı

Sayı : E-53305490-115.02-204248 28/11/2023
Konu : 223K335 Numaralı Proje Karar Yazısı

Sayın Sezgin DORUK

"1002-A Hızlı Destek Modülü" kapsamında Kurumumuza sunulan 223K335 numaralı ve "Yüksek Öğretimde Eğitim Dili İngilizce Olan Programlardaki Derslerde Sınıf Içi Konuşmaların Incelenmesi" başlıklı projenize ilişkin bilimsel değerlendirme süreci tamamlanmıştır.

Konunun uzmanı danışmanlar tarafından yapılan değerlendirmeler sonucunda proje önerinize destek verilmesine karar verildiğini bildirmekten memnuniyet duyarım (*).

Desteklenmesine karar verilen proje önerinizin ilgili mevzuat çerçevesinde, mali ve benzeri konularda değerlendirme çalışmalarına başlanmıştır. Süreç tamamlandığında projelere ait sözleşme ve diğer belgeler imzalanmak üzere tarafınıza gönderilecektir.

Başarınızı tebrik eder, saygılar sunarım.

Alperen Zekeriya KARATAŞ
Sosyal ve Beşeri Bilimler Araştırma Destek Grubu (SOBAG)
Grup Koordinatörü V.

PUAN SEVİYESİ: B

A: Çok İyi B: İyi C: Orta D: İyi Değil E: Yetersiz F: Özgün Değeri Yetersiz

Panel puanı A ve B seviyesinde olan projeler desteklenmiştir.

* Bir kişi kariyer hayatı boyunca 1002-A Hızlı Destek Modülü ve 1002-B Acil Destek Modülü kapsamında toplamda en fazla beş kez proje yürütücüsü olarak görev alabilir.

Belge Doğrulama Kodu: DwbYd7EfIhlpbHfbzLiQnFbqnAI= Bu belge elektronik olarak imzalanmıştır. Belge Doğrulama Adresi: https://pys.tubitak.gov.tr/belgeSorgula.htm

Araştırma Destek Programları Başkanlığı (ARDEB)
İşçi Blokları Mahallesi, Muhsin Yazıcıoğlu Caddesi, No:51/C, 06530, Çankaya/ANKARA
Telefon No: (0312) 468 53 00 Faks No: (0312) 427 74 89
eposta:iletisim@tubitak.gov.tr İnternet Adresi:www.tubitak.gov.tr

Panel Yönetim Sistemi(PYS)
https://pys.tubitak.gov.tr/

APPENDIX B

INITIAL CODING FRAME

1. Warm-up to the Topic
    - Conceptual Scaffolds:
        - Bridging (Walqui, 2006): Connecting new content to students' prior knowledge.
        - Contextualizing (Walqui, 2006): Using real-world examples to make content relevant.
    - Affective Scaffolds:
        - Recruitment (Wood et al., 1976; Van de Pol et al., 2010): Capturing student interest and engagement.
    - Cognitive scaffolds:
        - Direction Maintenance (Van de Pol et al., 2010): Keeping students focused on the learning task.
2. Transition to the Main Topic
    - Conceptual Scaffolds:
        - Contextualizing (Walqui, 2006): Providing context to new content.
    - Cognitive Scaffolds:
        - Modeling (Walqui, 2006; Van de Pol et al., 2010): Demonstrating tasks and thought processes.
        - Demonstration (Wood et al., 1976): Showing how to perform tasks.
        - Instructing (Van de Pol et al., 2010): Giving clear, step-by-step instructions.
3. Helping Students Understand Better, by Simplifying or Amplifying

- Cognitive Scaffolds:
  - Schema Building (Walqui, 2006): Organizing information into coherent structures.
  - Reduction in Degrees of Fredom (Wood et al., 1976): Simplifying tasks to reduce complexity.
  - Cognitive Structuring (Van de Pol et al., 2010): Structuring information to enhance understanding.
  - Giving of Hints (Van de Pol et al., 2010): Providing clues or suggestions.
  - Explaining (Van de Pol et al., 2010): Clarifying concepts and ideas.
- Conceptual Scaffolds:
  - Representing Text (Walqui, 2006): Using different representations to make content accessible.
- Affective Scaffolds:
  - Contingency Management/Frustration Control (Wood et al., 1976): Managing students' emotions and maintaining a supportive environment.b

4. Assessment
   - Cognitive Scaffolds:
     - Feeding Back (Van de Pol et al., 2010): Providing feedback on performance.
     - Questioning (Checking Understanding) (Van de Pol et al., 2010): Assessing understanding through questions.

5. Guiding – Metacognitive Support
   - Metacognitive Scaffolds

- Marking Critical Features (Wood et al., 1976): Highlighting key information and concepts.
- Questioning (For Metacognitive Thinking) (Van de Pol et al., 2010): Encouraging deeper thinking and self-reflection.
- Developing Metacognition (Walqui, 2006): Promoting self-awareness and regulation in learning.

APPENDIX C

UPDATED / FINALIZED CODING SCHEME

1. Warm-up to the Topic
    - Conceptual Scaffolds:
        - Bridging (Walqui, 2006)
        - Contextualizing (Walqui, 2006)
            - Watching a video
            - Showing pictures
        - Explaining the Objective of the Course (New Addition)
    - Cognitive Scaffolds:
        - Direction Maintenance (Van de Pol et al., 2010)
        - Questioning for promoting interaction (New Addition)
    - Affective Scaffolds:
        - Recruitment (Wood et al.,1976; Van de Pol et al., 2010)
2. Transition to the Main Topic
    - Conceptual Scaffolds:
        - Contextualizing (Walqui, 2006) (New Addition)
            - Providing Examples (to demonstrate a process) (New Addition)
        - Highlighting Key Considerations (New Addition)
    - Cognitive Scaffolds:
        - Modelling (Walqui, 2006; Van de Pol et al., 2010)
        - Demonstration (Wood et al.,1976)
        - Instructing (Van de Pol et al., 2010)

3. Helping Students Understand Better, by Simplifying or Amplifying
    - Cognitive Scaffolds:
        - Schema Building (Walqui, 2006)
        - Reduction in Degrees of Freedom (Wood et al.,1976)
        - Cognitive Structuring (Van de Pol et al., 2010)
        - Giving of Hints (Van de Pol et al., 2010)
        - Explaining (Van de Pol et al., 2010)
        - Translation of a Word or Phrase (New Addition)
        - Providing Examples (to clarify or simplify concepts) (New Addition)
        - Code-Switching (New Addition)
        - Translanguaging (New Addition)
        - Repeating the same process in different context (New Addition)
    - Conceptual Scaffolds:
        - Representing Text (Walqui, 2006)
    - Affective Scaffolds:
        - Contingency Management/Frustration Control (Wood et al.,1976)
        - Checking Attention ("Are you with us? Are you listening?") (New Addition)
4. Assessment
    - Cognitive Scaffolds:
        - Feeding Back (Van de Pol et al., 2010)

        - Questioning (Checking Understanding) (Van de Pol et al., 2010)
    - Conceptual Scaffolds:
        - Who Remembers...? (Checking Prior Knowledge) (New Addition)
5. Guiding – Metacognitive Support
    - Metacognitive Scaffolds:
        - Marking Critical Features (Wood et al.,1976)
        - Questioning (For Metacognitive Thinking) (Van de Pol et al., 2010)
        - Developing Metacognition (Walqui, 2006)
        - Re-Evaluating and Re-Approaching Material from another aspect (New Addition)

APPENDIX D

ETHICS COMMITTEE APPROVAL

GEBZE TEKNİK ÜNİVERSİTESİ	**T.C.** **GEBZE TEKNİK ÜNİVERSİTESİ** **İNSAN ARAŞTIRMALARI ETİK KURULU KARARLARI**
Oturum Tarihi: **23.03.2023**	**Oturum Sayısı:** **2023/04**

KARAR:04-03) Üniversitemiz Yabancı Diller Bölümü Öğr. Gör. Sezgin DORUK'un 09.03.2023 tarihli ve 97791 sayılı başvurusu görüşüldü ve aşağıdaki şekilde değerlendirildi.

Başvuru Tarihi:	09.03.2023
Protokol Sıra No:	04-02
Sorumlu Araştırmacıların Adı:	Öğr. Gör. Sezgin DORUK- Prof. Dr. Yasemin BAYYURT- Prof. Dr. Belma HAZNEDAR
Çalıştığı Birim:	Yabancı Diller Bölümü
Proje Çalışmasının Adı:	"An İnvestigation on Classroom Discourse in EMI Courses in Turkish Higher Education"
Toplantı Tarihi ve Oturum Sayısı:	23.03.2023 – 2023/04-03

Değerlendirme:

Araştırmanın Amacı:

Bu araştırmanın birinci amacı derslerin İngilizce olarak verildiği fakülte derslerinde dersi veren öğretim görevlileri ve/veya öğretim üyeleri tarafından ders içeriklerini öğrenmeyi destekleyici (scaffolding) en iyi uygulamaları incelemektir. Ayrıca ders içinde kullanılan dilin "Global English" olarak incelenmesi ikinci amaçtır.

Araştırmanın Gerekçesi:

Vygotsky (1978) sosyal etkileşimin ve öğrenme desteğinin önemli olduğunu vurgulamaktadır.

Araştımalara göre destekleyici uygulamaların (scaffolding) öğrenmenin kalitesini özellikle de öğrenme çıktılarını iyileştirdiği görülmektedir (Doo et.al, 2020). Birçok araştırmacı farklı yaş gruplarındaki öğrencileri için derslerde öğrenmeyi destekleyici uygulamaların kullanıldığı ortaya çıkarmıştır. Bu tarz desteklenmiş öğretimin öğrencilerin yaşları arttıkça daha faydalı olduğu ifade edilmektedir (Doo et.al, 2020). Bundan dolayı üniversite öğrencilerinde ders esnasında öğrenmeyi destekleyici uygulamalar daha faydalı olabileceği düşünülmektedir.

Bu bağlamda İngilizce olan fakülte derslerinde öğrenmeyi destekleyici uygulamalar daha da önemli hale gelmektedir. İkinci dilde eğitimde birçok zorluk çıkabilmektedir ve bu zorlukların çoğu destekleyici uygulamalar ile aşılabilir (Mahan, 2022).

Bu çalışmamdaki amaç İngilizce olarak verilen fakülte derslerinde kullanılan farklı destekleyici (scaffolding) uygulamaları keşfetmek ve bu bilginin yayılmasını sağlamaktır. Ders içeriklerinin öğrenilmesini destekleyici uygulamalar arasında çeşitli görsellerin kullanımı, teknolojinin kullanımı, önceden önemli kelimelerinin öğretimi, geri bildirim gibi uygulamalar karşımıza çıkabilir. Bu raporla iyi uygulamalar desteklenmiş ve yaygınlaştırılmış olacaktır.

Ayrıca İngilizcenin global bir dil olarak (ELF) kullanım örneklerini de ortaya çıkartarak İngilizce konuşurken karşılıklı anlaşılmanın daha önemli olduğunu ortaya çıkarmaktır.

Dünyada İngilizceyi ikinci dil olarak konuşanlar İngilizceyi anadili olarak konuşanlardan nüfus olarak daha fazladır. Bu bağlamda geleneksel İngilizce eğitiminde yapılan anadile vurgu azalmaktadır. Anadili İngilizce olmayanların kültürler arası iletişim becerilerinin İngilizce konuşurken kullanması daha değerli hale gelmiştir (Baker & Tsou, 2021).

Buna ek olarak karşılıklı anlaşılmanın daha önemsendiği durumlarda bazen kişilerin kendi anadilindeki kelime ve cümleler İngilizce konuşulurken cümle arasında kullanılabilir (translanguaging). Bunun yanında gramer kuralları da esnetilip öğrenciler ve eğitimciler arasında ortak bir global dil oluşturulabilir.

Dünyada Global English ifadesi son zamanlarda kabul görmekte ve yaygınlaşmaktadır. İngilizcenin yabancı dil olarak eğitimde kullanıldığı Japonya'da, Güney Kore'de, Almanya'da, Fransa'da birçok araştırma göstermektedir ki İngilizce konuşulurken karşılıklı anlaşılmak için İngilizcenin birebir kurallarına uyulmasına gerek olmayabilir ve bu durum konuşanların kendini daha rahat ifade etmesine yardımcı olmaktadır.

Bu Global English durumunun fakülte sınıflarındaki durumunu ve farklı örneklerini incelemek ve Global English kullanımının derslerin daha iyi anlaşılmasına nasıl yardımcı olduğunu göstermek de ikinci araştırma

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amacımdır.

Araştırmanın Yöntemi:

Fakültelerde ders veren öğretim görevlilerin / öğretim üyelerinin derslerinde kullanılan farklı destekleyici uygulamaların neler olabileceği ve/veya olabileceği üzerine bir anket ve sonrasında yarı yapılandırılmış bir görüşme planlanıyor.

Ayrıca öğretim görevlilerin / öğretim üyelerinin iznine tabi olarak ders gözlemi yapılıp bu uygulamaların örnekleriyle kaydedilmesi planlanmaktadır.

Çalışmaya Katılacak İnsanlarda Aranacak Özellikler:

- Fakültelerde eğitim dilinin İngilizce olarak kullanıldığı derslerin öğretim görevlisi ve/veya öğretim üyelerinin olması.
- Kendi dersini en az 3 sene İngilizce dilinde veriyor olması.
- Çalışmaya katılımda gönüllü olması.

Kullanılacak Psikolojik ve Teknik Yöntemler:

Literatürde görüşme modeline uygun olarak hazırlanmış yapılandırılmış bir anket ve yarı yapılandırılmış görüşme sorularıyla öğretim görevlisi / öğretim üyeleri hocaların konu ile ilgili görüşleri alınacaktır.

Etik Özet:

Ankete ve görüşmelere katılım gönüllülük esasına bağlıdır. Katılım öncesinde katılımcılara araştırmanın amacı ve katılımcının yapması gerekenler hakkında bilgi verilecek. Çalışmanın sonuçları istenildiği takdirde katılımcılarla paylaşılacaktır.

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Proje Yöneticisi: Öğr. Gör. Sezgin DORUK - Prof. Dr. Yasemin BAYYURT - Prof. Dr. Belma HAZNEDAR
Proje Araştırmacısı: -
Projenin Yönetileceği Kuruluş: -

Olası Tehlikeleri: -

Araştırmanın nasıl finanse edileceği / Finanse eden kurum:

Araştırma Bütçesi:

İnsan Araştırmaları için kullanılacak tutar:

KARAR

Kurul Üyelerinin bu çalışma ile ilişkisinin olup olmadığı incelenmiş olup, Kurul üyelerinin bu çalışma ile ilgili bir bağlantısı olmadığı görülmüştür.

☒ X	**Uygun** Üniversitemiz Yabancı Diller Bölümü Öğr. Gör. Sezgin DORUK'un "An Investigation on Classroom Discourse in EMI Courses in Turkish Higher Education" başlıklı projesi kapsamında kullanmak üzere Etik Kurulumuza sunduğu belgeler kurul üyeleri tarafından incelenmiş ve bir sakınca görülmemiş olup kullanımı için **etik onayı verilmesine** toplantıya katılanların **oybirliği** ile karar verildi.
☐	**Uygun Değildir (Gerekçesi)**
☐	**Düzeltilmesi Gerekir yada Yeniden Düzenlenmesinden sonra tekrar başvurulması**

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	yönünde tavsiye kararı (Tavsiye edilen düzeltmeler ve düzenlemeler)

ASLININ AYNIDIR
23.03.2023

Prof. Dr. Mahmut DURMUŞ
Başkan

APPENDIX E

DESCRIPTIVE DATA FOR QUESTIONNAIRE ITEMS

Questions	Departments	N	Mean	Std. Deviation
Our teacher using different scaffolding techniques contributes to a more interactive classroom environment.	civil engineering	29	4.35	.551
	mechanical engineering	27	4.30	.609
	chemistry	10	4.30	.483
	computer engineering	41	4.18	.667
	business	36	4.17	.697
	physics	12	4.50	.707
	Total	155	4.25	.628
I believe that our teacher's scaffolding practices contribute to students' discussions about the lesson.	civil engineering	29	4.23	.617
	mechanical engineering	27	4.22	.577
	chemistry	10	4.20	.422
	computer engineering	41	3.88	.754
	business	36	3.97	.810
	physics	12	4.50	.707
	Total	155	4.06	.705
I think that the scaffolding practices used by our teacher increase students' active participation.	civil engineering	29	4.03	.875
	mechanical engineering	27	4.04	.759
	chemistry	10	4.40	.516
	computer engineering	41	3.86	.791
	business	36	3.94	.826
	physics	12	3.50	2.121
	Total	155	3.97	.813
The scaffolding techniques used by our teacher enable students to talk more about the subject in class.	civil engineering	29	4.13	.718
	mechanical engineering	27	4.04	.706
	chemistry	10	4.10	.876
	computer engineering	41	3.86	.707
	business	36	3.83	.971
	physics	12	3.50	2.121
	Total	155	3.95	.804
Only our teacher should engage in in-class discussions during the lesson.	civil engineering	29	2.16	.934
	mechanical engineering	27	2.52	1.014
	chemistry	10	3.10	1.449
	computer engineering	41	2.45	1.062
	business	36	2.75	1.296

	physics	12	1.50	.707
	Total	155	2.50	1.130
For me, it is more important for the teacher to only explain the topic and work alone in class than for the lesson to be interactive between the teacher and the students.	civil engineering	29	2.35	1.170
	mechanical engineering	27	2.19	1.145
	chemistry	10	3.20	1.549
	computer engineering	41	2.27	1.016
	business	36	2.89	1.237
	physics	12	1.50	.707
	Total	155	2.46	1.191
In class, students should prefer giving short answers to questions rather than long ones.	civil engineering	29	3.19	.873
	mechanical engineering	27	3.44	1.050
	chemistry	10	3.40	1.265
	computer engineering	41	3.22	1.141
	business	36	3.31	1.142
	physics	12	3.50	2.121
	Total	155	3.29	1.081
I actively participate in class.	civil engineering	29	2.97	.912
	mechanical engineering	27	2.85	.949
	chemistry	10	3.90	.876
	computer engineering	41	2.90	1.123
	business	36	3.36	1.046
	physics	12	4.50	.707
	Total	155	3.10	1.055
I raise my hand to participate in class.	civil engineering	29	3.52	.926
	mechanical engineering	27	3.11	.934
	chemistry	10	3.70	1.494
	computer engineering	41	3.04	1.136
	business	36	3.47	1.055
	physics	12	4.50	.707
	Total	155	3.31	1.085
I answer questions in class.	civil engineering	29	3.52	.851
	mechanical engineering	27	3.07	.958
	chemistry	10	3.90	.876
	computer engineering	41	2.96	1.040
	business	36	3.67	.926
	physics	12	4.00	.000
	Total	155	3.33	.994
When I don't understand something in class, I ask questions.	civil engineering	29	3.52	.926
	mechanical engineering	27	3.56	.934
	chemistry	10	4.00	.816
	computer engineering	41	3.14	1.155

	business	36	3.89	.747
	physics	12	5.00	.000
	Total	155	3.54	1.008
I prefer our teacher to ask us questions about the topic during class.	civil engineering	29	3.58	.848
	mechanical engineering	27	3.37	1.079
	chemistry	10	3.90	1.101
	computer engineering	41	3.55	.959
	business	36	3.67	1.014
	physics	12	4.50	.707
	Total	155	3.59	.979
It is important to share student opinions during classes.	civil engineering	29	3.81	.792
	mechanical engineering	27	4.00	.877
	chemistry	10	4.40	.516
	computer engineering	41	3.92	.672
	business	36	4.11	.523
	physics	12	3.00	2.828
	Total	155	3.97	.747
Interaction between the teacher and students is important for lessons.	civil engineering	29	4.23	.617
	mechanical engineering	27	4.19	.622
	chemistry	10	4.50	.527
	computer engineering	41	4.27	.569
	business	36	4.08	.649
	physics	12	3.50	2.121
	Total	155	4.21	.631
I prefer teachers to ask more questions to encourage students to share their thoughts on the topic during class.	civil engineering	29	3.65	.798
	mechanical engineering	27	3.85	.864
	chemistry	10	3.80	1.135
	computer engineering	41	3.67	.851
	business	36	3.92	.841
	physics	12	3.00	2.828
	Total	155	3.75	.885

APPENDIX F

FOCUS GROUP INTERVIEW QUESTIONS FOR EMI STUDENTS

1. When you hear the term teacher-student interaction, what is the first thing that comes to your mind? (Introductory Q.)
2. How important is the interaction between instructor and student in the classroom for you? Could you rate it from 1 lowest to 5 highest? (Transition Q.)
3. What do you think increases teacher-student interaction in the classroom? (Key Q.)
4. What do you think decreases teacher-student interaction in the classroom? (Key Q.)
5. What are the factors that hinder your interaction/participation in class? (Key Q.)
6. What effective strategies could teachers implement to promote interaction in the classroom? How do these strategies impact the lesson? (Key Q.)
7. Which of the learning support tools such as feedback (1), providing hints (2), giving directions (3), explanations (4), demonstrating as a model (5), and asking questions (6) do you observe in your classes?
8. If you could change something about the interaction in classes, what would it be? (Ending Q.)

APPENDIX G

INTERVIEW QUESTIONS FOR EMI INSTRUCTORS

1. When you hear the term teacher-student interaction, what is the first thing that comes to your mind? (Introductory Q.)
2. How important is the interaction between instructor and student in the classroom for you? Could you rate it from 1 lowest to 5 highest? (Transition Q.)
3. What do you think increases teacher-student interaction in the classroom? (Key Q.)
4. What do you think decreases teacher-student interaction in the classroom? (Key Q.)
5. Can you give examples of support techniques you use to facilitate student interaction and understanding during the lesson? / Which of the learning support tools such as feedback (1), providing hints (2), giving directions (3), explanations (4), demonstrating as a model (5) and asking questions (6) do you use in your classes? (Key Q.)
6. How do support techniques during class affect student engagement? Have you noticed any changes in student interactions after using these support tools?
7. If you could change something about the interaction in classes, what would it be? (Ending Q.)

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