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**Investigating the Adoption of English as a  
Medium of Instruction in the Department of  
Mathematics at the University of Tlemcen: The  
Case of First-Year Students**

Dissertation submitted to the Department of English as a partial fulfilment of the requirements for a Master's degree in Didactics of Foreign Languages.

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## **Declaration**

I confidently affirm that this research study was carried out under my own hands and efforts, from the formulation of the research questions till the analysis of the findings and not by others. The work is original and not plagiarised, except where explicitly stated otherwise.

Esmaa Benzouba

05/06/2025

## **Dedication**

I dedicate this dissertation to:

My beloved parents, whose unwavering support and wisdom have been the  
foundation of my success.

My precious sister, whose vibrant spirit and laughter enrich my life.

And my supportive brothers, who help me tackle any challenge with confidence.

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## **Abstract**

The English Medium of Instruction is an increasingly adopted system in higher education across various countries in response to the global spread of the English language. In Algeria, this approach has recently been embraced within scientific fields to align with the international trend. This study aimed to investigate this new shift at the University of Tlemcen, uncovering the struggles of teachers and students with the new policy, and proposing effective solutions. To achieve these objectives, a comprehensive exploratory case study was conducted in the Mathematics Department at the University of Tlemcen, involving 59 first-year students and five of their instructors. Data collection was conducted through classroom observations, interviews with teachers, and questionnaires with students, followed by both qualitative and quantitative analyses. The findings revealed that the adoption of this trend in Algeria is still in its initial stages and needs careful implementation. The study also uncovered the significant challenges encountered by teachers and students in an EMI classroom, primarily revolving around low English level and readiness on both sides. Furthermore, it reveals their insights on addressing these challenges, which varied from providing adequate language training to adopting a gradual implementation strategy. To conclude, for Algeria to successfully implement EMI and enhance the teaching and learning experience, a cautious and well-structured approach is essential.

## Table of Contents

Declaration.....	I
Dedication.....	II
Acknowledgements.....	III
Abstract.....	IV
Table of Contents.....	V
List of Tables.....	VIII
List of Figures.....	IX
List of Acronyms and Abbreviations.....	XI
<b>General Introduction.....</b>	<b>1</b>
<b>Chapter One: Literature Review on EMI .....</b>	<b>5</b>
1.1. Introduction.....	7
1.2. Historical Background of Language Policy in Algeria.....	7
1.2.1. The Spread of Arabic and French in Algeria.....	7
1.2.2. Arabization Policy post Independence.....	8
1.2.3. Promoting English in Algeria as a Part of Arabization.....	9
1.2.4. Promoting English as a Reaction to Globalisation.....	10
1.3. English as a Medium of Instruction (EMI).....	11
1.3.1. Definition of EMI.....	12
1.3.2. Types of EMI.....	13
1.3.2.1. Models of EMI Pedagogies.....	13
1.3.3. The Benefits of Implementing EMI.....	16
1.3.4. Challenges of Implementing EMI in Higher Education.....	16
1.3.5. Models of Language Support in EMI.....	19

1.3.6. Translanguaging.....	20
1.3.7. English for Specific Purposes (ESP).....	22
1.3.7.1. Definition and Characteristics of ESP.....	22
1.3.7.2. Classification of ESP.....	23
1.3.7.3. Needs Analysis.....	23
1.3.7.4. ESP Course Design.....	24
1.3.7.5. ESP Contribution to EMI in Higher Education.....	25
1.4. The Implementation of EMI in Higher Education in Algeria.....	26
1.4.1. Algerian Teachers' and Students' Attitudes towards EMI.....	27
1.5. Previous studies related to the Implementation of EMI in Higher Education...28	
1.6. Conclusion.....	30
<b>Chapter Two: Research Methodology, Data Analysis, and Interpretation.....</b>	<b>32</b>
2.1. Introduction.....	33
2.2. Situational Analysis.....	33
2.3. Research Design.....	34
2.4. Sampling.....	35
2.5. Data Collection.....	35
2.5.1. Classroom Observation.....	36
2.5.2. Interview.....	37
2.5.3. Questionnaire.....	39
2.6. Data Analysis.....	40
2.6.1. Classroom Observation Results.....	41
2.6.1.1. Teachers' Performance.....	41
2.6.1.2. Learners' Behaviour.....	42
2.6.2. Teachers' Interview.....	42

2.6.3. Students' Questionnaire Results.....	46
2.7. The Interpretation and the Discussion of the Data.....	63
2.8. Recommendations.....	65
2.8.1. Recommendations for the Ministry of Higher Education.....	66
2.8.2. Recommendation for the Department of Mathematics.....	66
2.9. Conclusion.....	67
<b>General Conclusion</b> .....	<b>69</b>
<b>Bibliography</b> .....	<b>73</b>
<b>Appendices</b> .....	<b>80</b>
Appendix A: Ministerial Decrees.....	81
Appendix B: L1 English lesson.....	84
Appendix C: Permission to Pursue the Study.....	85
Appendix D: Observation Grid.....	86
Appendix E: Teachers' Interview.....	87
Appendix F: Students' Questionnaire.....	89
Appendix J: The Recommended ESP Course.....	96

## **Lists of Tables**

Table 2.1. The Aims of the Interview Questions.....	38
Table 2.2. The Students' English Training Coverage of Different Skills.....	49
Table 2.3. The Positive Impact of English on Mathematics Students' Scientific and Knowledge Development.....	61
Table 2.4. Students' Suggestions on Improving and Simplifying the Use of English as a Medium of Instruction.....	63

## List of Figures

Figure 1.1. The Four Models of EMI Pedagogies (Sahan et al., 2021, p. 8).....	14
Figure 1.2. Challenges of EMI (Kriukow & Galloway, 2018, p.145).....	18
Figure1.3. ESP Classification by Robinson (1991, p.4).....	23
Figure 2.1. Students' Gender.....	46
Figure 2.2. Students' Age Range.....	46
Figure 2.3. Students' English level.....	47
Figure 2.4. Students' Training Experience.....	48
Figure 2.5. Students' Training Experience Focus.....	48
Figure 2.6. The Frequency of Teachers' Usage of English in the Classroom.....	50
Figure 2.7. Languages Used by the Teacher Other than English.....	51
Figure 2.8. The Usefulness of Code-Switching.....	51
Figure 2.9. The Language that the Students Are Mostly Comfortable with as an Instructional Language.....	52
Figure 2.10. The Languages that the Students Are More Comfortable with as Instructional Languages.....	53
Figure 2.11. Frequency of Difficulties in Understanding English-Medium Lectures.....	53
Figure 2.12. Impact of English Proficiency on Lesson Comprehension.....	54
Figure 2.13. The Usefulness of the Assigned English Course.....	55
Figure 2.14. Students' Confidence in Using English in the Classroom.....	55
Figure 2.15. Frequency of English Use in Classroom Participation.....	56
Figure 2.16. The Preferred Language for Classroom Participation.....	57
Figure 2.17. The Preferred Languages for Classroom Participation.....	57
Figure 2.18. Frequency of Participation Avoidance Due to English Proficiency....	58

Figure 2.19. Students' Difficulties in Asking Questions in English.....	59
Figure 2.20. The Languages Used by Students to Write Their Notes.....	59
Figure 2.21. The Preferred Language for Students to Write Their Notes.....	60
Figure 2.22. The Effects of the English Language in Exams.....	61

## **List of Acronyms and Abbreviations**

- AA: Algerian Arabic
- CA: Classical Arabic
- CEIL: Centre d'Enseignement Intensif des Langues
- CLIL: Content and Language Integrated Learning
- DA: Dialectal Arabic
- EAP: English for Academic Purposes
- ELP: English for Legal Purposes
- ELT: English Language Teaching
- EMI: English as a Medium of Instruction
- EMP: English for Medical Purposes
- EOP: English for Occupational Purposes
- ESP: English for Specific Purposes
- EST: English for Science and Technology
- IELTS: International English Language Testing System,
- L1: First language
- L1: First-year students
- L2: Second language
- MAA: Maître Assistant class A
- MCA: Maître de Conference class A
- MCB: Maître de Conference class B
- MSA: Modern Standard Arabic
- PDF: Portable Document Format
- PhD: Doctor of Philosophy
- TOEFL: Test of English as a Foreign Language
- UK: United Kingdom
- USA: United States of America

# **General**

# **Introduction**

Globalisation is fundamentally transforming how one perceives and engages with the world, impacting cultural, economic, political, and ecological dimensions (Steger, 2020). Over the last decade, the forces of internationalism and globalisation have introduced new dynamics that make the world feel smaller and more interconnected. A key driver of this change is the rise of the global language, English, which serves as a universal means of communication. As David Crystal (2003) states, “A language achieves a genuinely global status when it develops a special role that is recognised in every country” (p.3). English has undeniably established itself as a global language. It is omnipresent, seen on signs everywhere, and heard in conversations across the nation. Regardless of the country one visits, one will find people speaking English (Crystal, 2003). As a result, people are now able to engage with each other's cultures and perspectives more easily, establishing English as the dominant language across various domains, including business, science, technology, and education.

This growing interconnectedness has also highlighted a shared language in academic and professional contexts, leading to an increasing use of English as a medium of instruction in many institutions worldwide, including those in Algeria. Algerian universities have adopted English as a Medium of Instruction (EMI) in their scientific departments in response to the Ministry of Higher Education's decision to introduce EMI in 2023. This marked a significant shift in Algerian history, as French had been the primary medium of instruction since independence. It is a fact that French loosened up every decade, but it was always considered the academic language in universities. The transition to a new language of instruction presents significant challenges. Historically, Modern Standard Arabic (MSA) and Dialectal Arabic (DA) have been used as the medium of instruction from elementary school to high school, while university educators have traditionally taught in French. Therefore, switching the medium of instruction to English at universities is a crucial step that comes with its own set of difficulties for both teachers and students.

Moreover, this study examines the implementation of EMI at Tlemcen University, particularly within the Mathematics Department, which plays a crucial role in evaluating the success of this transition. The research makes an important

contribution to the existing literature by highlighting the realities of EMI classes. The purpose of this study is to reveal the hidden struggles that teachers and students encounter in an EMI classroom, to foster a suitable learning and teaching environment. By exploring and assessing the effectiveness of EMI within first-year students and their teachers at the Mathematics Department, this study will contribute to the current shift in educational policy, identifying the challenges faced by educators and learners, and proposing solutions to overcome them.

To effectively address the research objectives, three key questions were raised:

- RQ1: What are the main challenges that first-year students at the Department of Mathematics at the University of Tlemcen face with the adoption of EMI?
- RQ2: What are the difficulties faced by teachers at the Department of Mathematics at the University of Tlemcen when using EMI?
- RQ3: What strategies can support teachers and first-year students in achieving effective learning outcomes with the adoption of EMI at the Department of Mathematics at the University of Tlemcen?

The research questions led to the formulation of three hypotheses:

- Hyp1: First-year students at the Department of Mathematics at the University of Tlemcen face difficulties understanding lectures delivered in English and struggle to express their ideas clearly during classroom participation due to their limited proficiency in English and the lack of prior exposure to English as a medium of instruction
- Hyp2: Teachers at the Department of Mathematics at the University of Tlemcen may face challenges in delivering lectures in English due to limited English proficiency as well as insufficiency and inadequacy of EMI teachers' training.
- Hyp3: The use of translanguaging strategies by teachers, the reinforcement of teacher training programs, and the development of context-appropriate course materials could enhance students' comprehension of course content in English

and contribute to achieving effective learning outcomes with EMI adoption at the Department of Mathematics at the University of Tlemcen.

To answer these questions and test the proposed hypotheses, the researcher conducted an exploratory case study involving 5 Mathematics teachers and 59 first-year Mathematics students at the University of Tlemcen. Moreover, this investigation employed a mixed-methods approach to gather and cover all the necessary data. To achieve this, a combination of quantitative and qualitative research instruments was employed. Specifically, classroom observations were conducted to gain insights into teaching practices and students' interactions while using English as the medium of instruction, while interviews with the teachers provided their in-depth experiences and suggestions. Additionally, questionnaires were distributed to gather information from students. All this was done to ensure that the research captured a holistic view of the educational EMI environment.

The research work is divided into two chapters for a purposeful approach. The first chapter serves as a literature review of the previous knowledge related to the subject matter. It emphasised the history of the linguistic situation in Algeria, focusing on the evolution of English and the spread of EMI in Algerian universities. It also discussed EMI in different settings, detailing its types, benefits, and challenges, while acknowledging the role of language support Models, translanguaging, and English for Specific Purposes (ESP) in enhancing EMI. Additionally, it highlighted the state of EMI in Algeria, drawing on previous studies that have contributed to this discourse. The second chapter focuses on the methodology employed in the study. It outlined the study setting, described the research design used, and specified the sample population along with the instruments used. This chapter also includes the analysis and interpretation of the data, concluding with suggestions for future studies and an examination of study limitations.

**Chapter One:**  
**Literature Review**  
**of EMI**



1.1. Introduction.....	7
1.2. Historical Background of Language Policy in Algeria.....	7
1.2.1. The Arabic and French Spread in Algeria.....	7
1.2.2. Arabization Policy after Independence.....	8
1.2.3. Promoting English in Algeria as a Part of Arabization.....	9
1.2.4. Promoting English as a Reaction to Globalisation.....	10
1.3. English as a Medium of Instruction (EMI).....	11
1.3.1. Definition of EMI.....	12
1.3.2. Types of EMI.....	13
1.3.2.1. Models of EMI Pedagogies.....	13
1.3.3. The Benefits of Implementing EMI.....	16
1.3.4. Challenges of Implementing EMI in Higher Education.....	16
1.3.5. Models of Language Support in EMI.....	17
1.3.6. Translanguaging.....	20
1.3.7. English for Specific Purposes (ESP).....	22
1.3.7.1. Definition and Characteristics of ESP.....	22
1.3.7.2. Classification of ESP.....	23
1.3.7.3. Needs Analysis.....	23
1.3.7.4. ESP Course Design.....	24
1.3.7.5. ESP Contribution to EMI in Higher Education.....	25
1.4. The Implementation of EMI in Higher Education in Algeria.....	26
1.4.1. Algerian Teachers' and Students' Attitudes towards EMI.....	26
1.5. Previous studies related to the Implementation of EMI in Higher Education...	27
1.6. Conclusion.....	29

## 1.1. Introduction

In today's world, English has established itself as a crucial global language, often referred to as the “language of the world”, the “language of science”, and the “language of development”. This reality is undeniable, and it has been widely acknowledged and embraced by various institutions through the implementation of English as a Medium of Instruction (EMI). However, each country has adopted EMI differently. This first chapter aims to provide a thorough analysis of the literature on the subject of interest. The chapter highlights key points that are essential to the study. It demonstrates the Algerian linguistic landscape throughout history, emphasising the spread of English within the country. Furthermore, it explores EMI spread, examining its types, benefits, and challenges, while also discussing some language support models and the dynamic phenomena of translanguaging. Additionally, it also establishes a connection for English for Specific Purposes (ESP), which complements English Medium Instruction (EMI). Finally, the chapter demonstrates the adoption of EMI in Algeria and reviews some previous studies conducted on this significant topic, further enriching the discussion.

## 1.2. Historical Background of Language Policy in Algeria

Algeria has one of the most complex linguistic situations due to its rich history and the impact of political decisions. Throughout history, Algeria has experienced numerous invasions, including those by the Phoenicians, Romans, Vandals, Byzantines, Arabs, Turks, and the French, all of which contributed to its linguistic diversity, resulting in various language contacts. However, two of these influences stand out due to their profound impact on Algeria's linguistic landscape: the Arabs and the French (Benrabah, 2014). Given their significance, a more in-depth examination of their impact and dissemination is essential.

### 1.2.1. The Arabic and French Spread in Algeria

The Arab conquest and the French invasion brought significant changes to the language of communication, particularly among the native inhabitants of Algeria, the Berbers, as both introduced advanced administrative and educational systems (Belmihoub, 2018b). The spread of Arabic coincided with the rise of Islam, as Arab

Muslims conquered North Africa and spread Islam in the 7<sup>th</sup> century. Arabic was adopted quickly since it was seen as a prestigious and sacred language, the language of the Holy Quran. While the French language was forcefully imposed during a 130-year colonial rule from 1830 to 1962.

The French coloniser aimed to erase the language, culture, and religion of the Algerian people and replace them with French counterparts (Bouabdallah, 2022) resulting in a decline in the use of both Berber and Arabic (Benrabah, 2014). Thus, even the name “Algerians” was adopted by the coloniser, and the only reference left for the Algerians was “Muslims,” making the Arabic language an important part of their identity (Grandguillaume, 2004b), which ultimately contributed to the current linguistic situation in Algeria. The Algerians spoke French in schools, with the coloniser, yet they maintained their dialectal Arabic at home and with friends. Despite various attempts at deculturation, Arabic preserved its prestige as a language of the Holy Quran.

Therefore, after gaining independence in 1962, Algeria’s population became multilingual, consisting of Arabophones, Berberophones, and Francophones. It is worth mentioning that Arabic exists in three main varieties: Classical Arabic (CA), Modern Standard Arabic (MSA), and Dialectal Arabic (DA), commonly referred to as Algerian Arabic (AA). Although CA holds a prestigious status, it is mostly limited to Algerian Arabic (AA), prayers, mosque sermons, and other religious contexts. MSA, a refined and contemporary adaptation of CA, has emerged as the primary language for education, administration, and mass media. DA, on the other hand, serves as the mother tongue for the vast majority of the population, and it is the dominant language for everyday conversation and informal settings (Adder, 2024). Thus, the Algerians' shift back to Arabic after the heavy influence of French is an important point to highlight.

### **1.2.2. Arabization Policy after Independence**

From 1962 until the late 1990s, Algerian leaders aimed to create a strong national identity centred on Arabic. Furthermore, the government instituted intense Arabization campaigns, gradually establishing Arabic (MSA) as the primary

language of education and administration (Benrabah, 2007; Grandguillaume, 2004b). They believed that in ten to fifteen years Arabic would replace French completely as the official language of the country and English would replace French as a second language, acknowledging the beauty of the French language but emphasizing the bitter memories and painful association it held for them (Gordon, 1966, as cited in Benrabah, 2014, p.46). Indeed, Arabization was spread around the country in schools, aiming for a monolingual society. However, this rigid transition faced several challenges, including a lack of resources and qualified teachers. Additionally, another challenge the government faced was that scientific knowledge was heavily dependent on French, and Students educated solely in Arabic during their school years struggled when they reached university level, where many courses were still taught in French (Benrabah, 2007). This linguistic gap caused high failure rates at university. The absolute policy of Arabization proved unsuccessful, and by the early 2000s, the authorities openly declared that it was time for bilingual education (Benrabah, 2014).

### **1.2.3. Promoting English in Algeria as a Part of Arabization**

The 1962 ideology in Algeria of totally erasing French and replacing it with English in ten to fifteen years was never fully realised. However, a 2013 survey by the sociolinguist Benrabah (2014) among 204 Master's students from three language departments in the University of Mascara aimed to evaluate their understanding of the global linguistic landscape during that period. The study revealed that 92% regarded English as the "world" language. This led him to argue that English is a significant factor in the decline of the French language in Algeria. This objective aligns with the goals that Algerian policymakers sought to achieve in the 1990s

The English language began to gain prominence in Algeria in the 1980s, as the government sought to adopt a more liberal political stance and open its economy to the West. Indeed, a 1984 report by the British Council presented a sociolinguistic profile of English in Algeria, identifying it as a third language. In fact, English was needed for overseas training, technology transfer, and some areas of education. Therefore, the 1980s witnessed British and American support for English in Algeria: the British Council offering teaching programs and scholarships (Belmihoub, 2018a).

Moreover, English was seen by the supporters of MSA as a neutral language to lessen the influence of French (Jacob, 2019). Furthermore, in the 1990s, advocates of Arabization promoted the option for fourth-grade students in elementary schools to choose English instead of French. However, only 0.33% of the students chose English, highlighting the gap between the decisions made by policymakers and the population's expectations (Grandguillaume, 2004a; Miliani, 2001). While these policymakers aimed to eliminate the use of French as a part of the Arabization movement, many parents believed that French was more practical and beneficial for their children's future education and opportunities in Algeria.

### **1.2.4. Promoting English as a Reaction to Globalisation**

Previously, people associated French with access to knowledge. However, by the 2000s, Algerian youth became aware of the importance of the English language, recognising its vital role in connecting with developed countries. They understood that learning English would give them better chances both abroad and inside Algeria. They explained that English opens the door to an immense wealth of knowledge, illustrating that French is only for France and its colonies. At the same time, English serves as a global connector and a “language of science” (Jacob, 2019), enabling them to communicate and access knowledge from around the world.

In 2004, a written questionnaire developed by Benrabah was distributed to high school students to gauge their attitudes toward the competing languages in Algeria; 1051 students completed the questionnaire. This questionnaire showed that 58.6% favoured the combination of Arabic, English, and French as the languages that will allow them to live and prosper in and out of Algeria. This reinforces the earlier observation that introducing English as a rival to French in primary education during the 1990s was unsuccessful (see 1.2.3). Further evidence of this failure is illustrated by the low support for the choice of Arabic and English only, which was selected by just 3.9% of participants. These findings suggest that the respondents were not in support of policies aimed at replacing French with English. Instead, the young people surveyed in 2004 appear to prefer language policies that support multilingualism instead of replacing one language with another (Benrabah, 2007).

In the early 2000s, French was still considered the first foreign language and taught in primary school, while English was introduced in the first year of middle school. In 2022, and as a response to globalisation, new reforms were implemented. Thus, English gained another status in Algeria and has been implemented in 3rd-year primary schools starting from September 2022, reaching the same status as French (Bellalem, 2012), thereby providing learners with the skills necessary to succeed in tomorrow's world. Furthermore, in higher education, students' enrolment in the Department of English was higher than that of French (Benrabah, 2014). By 2023, the Ministry of Higher Education and Scientific Research started using EMI in the scientific departments of Algerian universities (see Appendix A). Having examined the case of Algeria, now time to turn to a broader discussion of EMI.

### **1.3. English as a Medium of Instruction (EMI)**

Over the last decade, with the increasing dominance of English as a global lingua franca, a significant focus has been put on using EMI in higher education. This instructional approach involves teaching academic subjects in English, especially in countries where English is not the first language. One indicator of this trend is the increasing number of universities worldwide that offer courses taught in English. The forces of globalisation and the increasing internationalisation of universities primarily drive this global spread of EMI. Many universities are adopting EMI to attract international students, enhance their global visibility, and improve their position in international rankings. Governments also support EMI policies to boost national competitiveness and prepare graduates for global labour markets where English proficiency is highly valued (Lasagabaster, 2022).

For example, in South Korea, universities receive government funding based on how many EMI courses they offer (Byun et al., 2011, as cited in Lasagabaster, 2022). This financial support has encouraged universities to adopt more EMI and has also attracted a greater number of international students. Similarly, in 2011, China's Ministry of Education instructed universities to ensure that 5–10% of undergraduate courses are taught in English or another foreign language within three years (Peng & Xie, 2021, as cited in Lasagabaster, 2022). For European countries, the

Nordic countries led the way in implementing EMI (Lasagabaster, 2022), and Sweden is one of them that has been offering English Medium Instruction (EMI) for over two decades (Airey et al., 2017, as cited in Kuteeva, 2018). This rapid expansion reflects Sweden's efforts to internationalise its universities, attract international students (Kuteeva, 2018). Moreover, North African countries such as Morocco are in a growing demand for EMI in universities; however, EMI is still in its beginning stages and is still limited to some private universities (Belhiah, 2022). Before diving deep into any concept, it is important to shed light on its definitions

### 1.3.1 Definition of EMI

Given the growing prevalence of EMI in academic institutions worldwide, it is essential to define its meaning from various perspectives. Furthermore, some define EMI as the effective use of the English language to teach academic subjects, apart from English itself, in countries where the first language of most of the population is not English (Macaro, 2018; Curle et al., 2020). However, this definition is somewhat narrow, given the complex nature of EMI. To address this, Taguchi (2014) expands the definition by emphasising that EMI also plays a crucial role in enhancing students' academic English proficiency. This concept aligns closely with Content and Language Integrated Learning (CLIL), which is a powerful educational strategy that focuses on the simultaneous learning and teaching of content through an additional language.

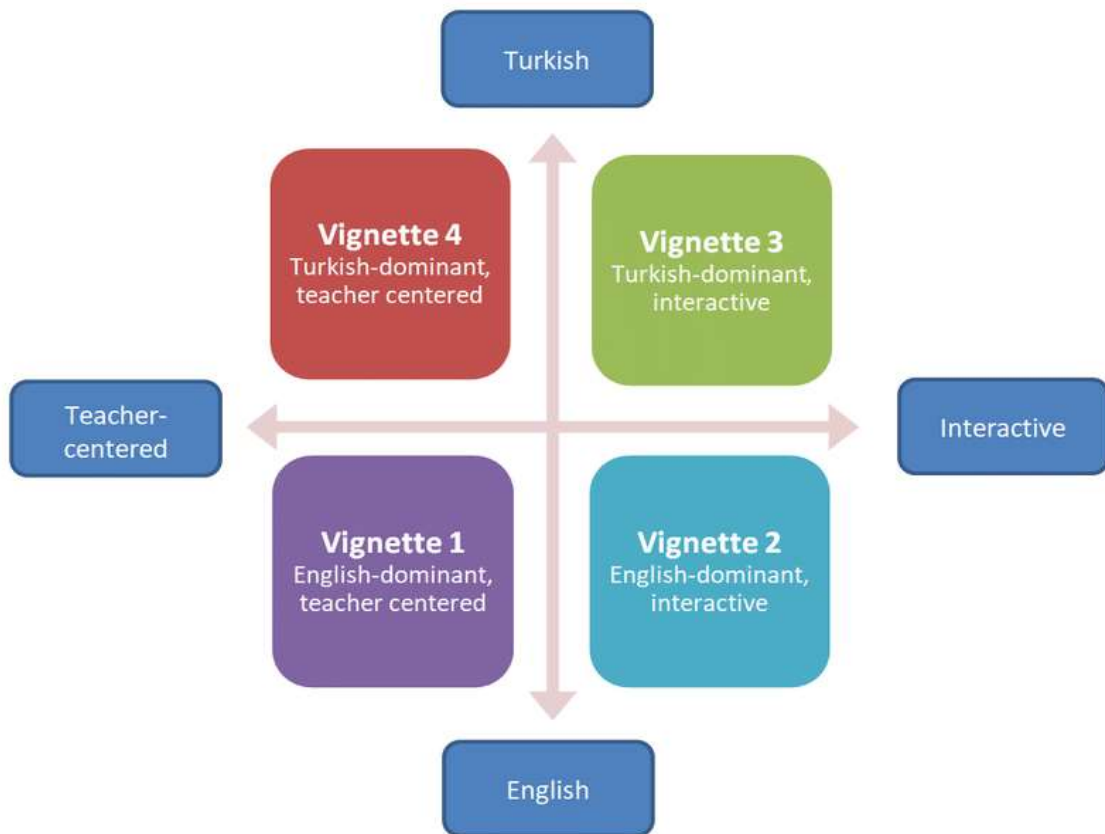
Jenkins (2018) offers yet another perspective, pointing out that EMI is not confined only to non-anglophone settings. Instead, it includes anglophone contexts such as the United States of America (USA), the United Kingdom (UK), and Australia, where the number of L2 English speakers has increased significantly in these countries due to global migration and student mobility. These varying definitions demonstrate the complexity of EMI, underscoring the need to examine how it is implemented across different educational contexts. To better understand its implementation, it is useful to explore the different types through which EMI is implemented.

### 1.3.2. Types of EMI

EMI can take multiple forms, depending on how and to what extent English is used as the medium of instruction. Therefore, Chou (2018) identified two primary types of implementing EMI: full EMI and partial EMI. Full EMI entails utilising English as a medium of communication extensively without any reliance on L1. This type is usually found in countries where EMI has been practised for a long time, and the students and teachers are proficient in English, like Sweden (Kuteeva, 2018). Partial EMI, as explained by Poon (2013), refers to classes where one or two subjects are taught in English only. Chou (2018) identified partial EMI as the use of bilingual communication, where the course materials and examination are in English, and translation of concepts and codeswitching in lectures is allowed. This type is adopted especially in regions where English proficiency is still developing, such as Turkey, which has it, and applies different models of pedagogies (Sahan et al., 2021).

#### 1.3.2.1. Models of EMI Pedagogies

Sahan et al. (2021) articulate four distinct models of EMI pedagogies. They integrate both the dominant language used and the level of teacher-student interactions. This is illustrated in Figure 1.1 below, which focuses on the context where Turkish is the first language (L1):



**Figure 1.1. The Four Models of EMI Pedagogies (Sahan et al., 2021, p. 8)**

Figure 1.1 is based on an analysis of 85 classroom observations and interviews with 21 different teachers in Turkey. It highlights four different teaching models in EMI, particularly regarding language use and interaction (Sahan et al., 2021).

### **Model 1: English-Dominant, Teacher-Centred**

As the name implies, this model is characterised by low levels of teacher-student interaction and minimal use of the first language (L1). In other words, the teacher takes the lead in delivering content almost exclusively in English, while students primarily listen and absorb information. The majority of the lecture was taught in English with a rare use of L1 limited to drawing students' attention to key points, checking understanding, or discussing “off-topic” aspects. Although students may participate in both L1 and English, teachers usually respond in English.

### **Model 2: English-Dominant, Interactive**

In this model, the teachers conduct most interactions in English, fostering a higher level of engagement between students and instructors. Teachers aim to increase student involvement despite their low English proficiency by scaffolding both language and content, often through simple, low-order questions that require brief responses. This approach reduces the linguistic burden on students and promotes dynamic, back-and-forth dialogue in English. Indeed, most student participation occurs in English, unlike Model 1.

### **Model 3: L1-Dominant, Interactive**

Characterised by a high degree of interactivity, this model relies heavily on the L1 while integrating English technical terms with it. By doing so, it helps students with low English proficiency better understand the content. Therefore, English is primarily found in written forms in materials like slides, textbooks, and on the board, as well as in spoken explanations of technical concepts. This is often achieved through insertional code-switching, where English technical terms are used without translating them into L1. For example, a teacher might read rules from English slides and then provide detailed explanations in the students' native language. This approach ensures that students are exposed to English technical vocabulary even though the main instruction was in L1.

### **Model 4: L1-Dominant, Teacher-Centred**

Similar to Model 3, this model primarily relies on L1 for instruction, restricting English to only the written materials and some English technical terms. While this may aid comprehension in the short term, it significantly reduces students' exposure to authentic spoken English. However, like model 1, it is a teacher-centred model, where the teacher dominates classroom discourse. As a result, students' participation is minimal.

By identifying and understanding these models, educators and policymakers can more effectively evaluate the effectiveness and impact of EMI on student learning outcomes. This nuanced approach enables a more informed discussion about the

benefits and challenges of EMI, particularly in enhancing both English language proficiency alongside academic success.

### 1.3.3 The Benefits of Implementing EMI

As EMI continues to gain momentum worldwide, its benefits on teaching and learning practices have become a subject of increasing attention. Research by Chapple (2015) demonstrates that the implementation of EMI boosts English proficiency among university students. Additionally, Kassteen (2013) notes that EMI can enhance academic progress by providing access to the latest resources and scholarly discourse in English. Also, it improves students' chances of college admission and academic success, especially in English-speaking institutions. Additionally, it provides students with higher employment prospects while also enabling them to publish their academic manuscripts in high-quality journals (Curle et al., 2022). Beyond the academic realm, EMI plays a crucial role in fostering cross-cultural understanding and global awareness, as it exposes learners to a diverse array of perspectives (Kassteen, 2013). All in all, "As the result of *more exposure to English*, students' English proficiency will be improved, which leads them to a brighter future." (Derakhshan et al., 2022, p. 37).

Furthermore, the implementation of EMI also provides some advantages to teachers, such as: enabling teachers to take part in academic mobility programs, allowing them to teach or attend training both within their country and abroad, and gaining insights into Western culture, which enriches their intercultural understanding. This cultural and linguistic competence enables them to participate actively in multilingual and multicultural academic communities, further expanding their professional networks and career prospects (Kriukow & Galloway, 2018).

### 1.3.4 Challenges of Implementing EMI in Higher Education

Every new idea or procedure would encounter some obstacles when applied in real life. Consequently, the introduction of EMI is often accompanied by promises of enhancing global competitiveness and academic prestige. However, the transition to such a model is not always as smooth or beneficial as initially expected, suggesting a need for thorough investigation. Furthermore, a systematic analysis conducted by

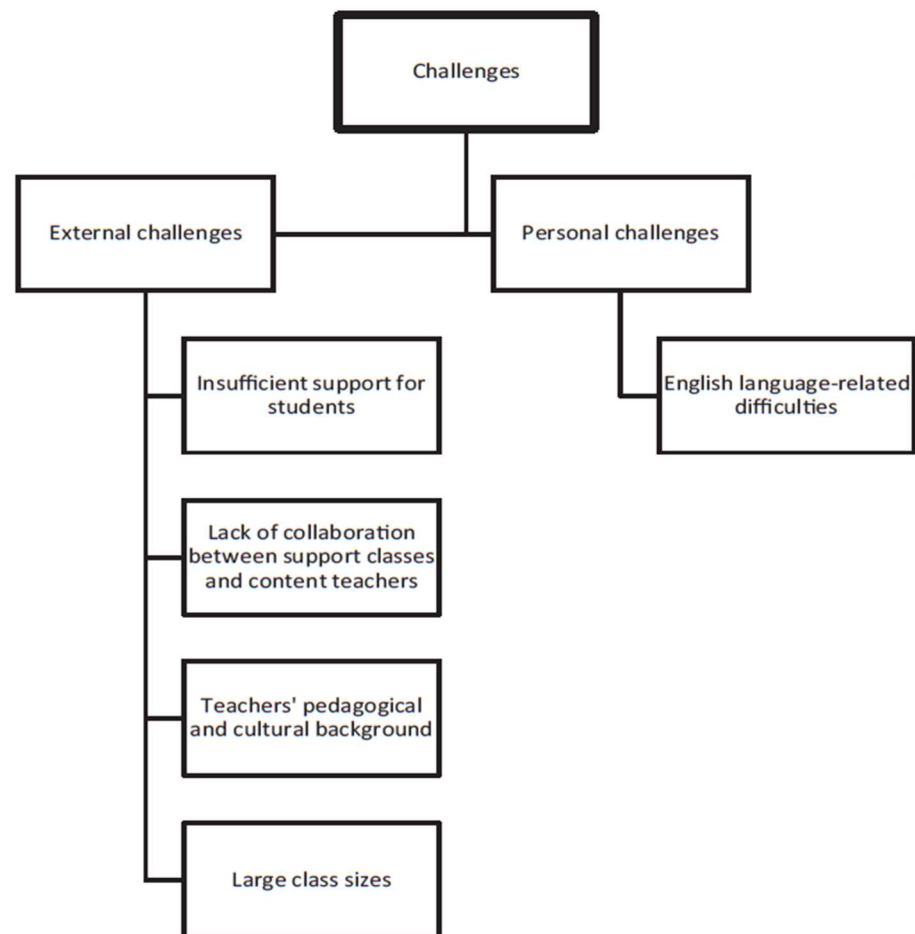
Liao et al. (2025) identified various challenges. Therefore, several EMI programs do not require students to meet minimum English language proficiency levels before enrolling. Even where such a standard exists, they often fail to ensure that students possess the necessary language skills for success.

Liao et al. (2025) explained that second language (L2) “requirements were neither standardised nor valid enough to admit well-prepared students for EMI” (p.8). As a result, many students are entering programs with poor English proficiency. In addition, once students enter EMI programs, they often receive little or no language support. This lack of assistance hinders their ability to cope with the demands of learning English, including insufficient resources like language training and English for Specific Purposes (ESP) courses. Moreover, Curricula are often not adapted for learners working in L2. Thus, the content is delivered as if all the students are proficient in English. While students may have some knowledge about general English that they gathered from previous experience, they often struggle with technical vocabulary, academic writing conventions, or critical thinking in English. This gap hinders their ability to participate, express ideas, and succeed in assessments.

Furthermore, many teachers are subject matter experts but lack training in instructing in English, which is crucial for supporting students' learning in a second language. Additionally, many teachers do not receive any training on how to teach their subject in English or support language learners effectively. This makes them struggle with classroom communication, leading them to abandon the use of EMI. In fact, teachers may not always use English as the sole medium of instruction and switch to L1, and sometimes they may rely heavily on the first language, due to low student proficiency or their own discomfort. In these situations, “teachers did not expect students’ oral and written responses, resulting in students having no chance to produce complex subject content”(Liao et al., 2025,p.8).

This reliance stifles students' development in English, as they are not challenged to produce complex content in the language. Also, the widespread use of the teacher-centred approach, where educators do most of the talking and students

passively listen, hinders the progress of students' academic English. Besides, there is often little collaboration between language and subject teachers. It limits teachers' ability to align goals, organise lessons effectively, and provide coordinated support to learners. These were the challenges identified by Liao et al.(2025) that were echoed, and categorised differently into external challenges and personal challenges by Kriukow and Galloway (2018), as illustrated in Figure 1.2.



**Figure 1.2. Challenges of EMI (Kriukow & Galloway, 2018, p.145)**

Although students viewed EMI positively in theory, they connected its practice with various challenges (Kriukow & Galloway, 2018). As demonstrated in Figure 1.2 above, external challenges refer to system-level barriers that individuals cannot control or change on their own. These include insufficient support for students, large classes that limit active learning and interactions, and a lack of collaboration between support (English) classes and content teachers. Additionally, teachers' pedagogical

and cultural background may not align with EMI methods, leading to further complications in implementation.

Personal challenges include difficulties related to the English language. Kriukow's and Galloway's (2018) study findings stated that students struggled with their self-esteem and believed that their English skills were not good enough for studying in EMI programs. This self-assessed weakness affected their confidence and made it harder for them to engage in lessons, ask questions, or express their understanding. In fact, "EMI entails different challenges that need to be faced, but perhaps the greatest import is that teaching staff need to deliver and students need to learn high-stakes content in an L2" (Lasagabaster, 2022, p.2). Therefore, specific solutions must be implemented to ensure the success of EMI.

### **1.3.5. Models of Language Support in EMI**

Macaro (2018) identifies four different ways that universities and institutions might support students' language development in EMI programs before or alongside content instruction. These four models are: Multilingual, concurrent, preparatory year, and section model.

#### **a-Multilingual Model:**

In this model, students are taught in both English and their L1, allowing them to study in a language they are more comfortable with while still developing English proficiency to support content comprehension and language learning. This approach creates a bilingual classroom with extensive code-switching. This model reduces cognitive overload and helps students grasp complex concepts without being hindered by language barriers. However, this model might slow the pace of learning English and require extra work from the content teacher.

#### **b-Concurrent Support Model:**

This model provides students, along with their EMI courses, with additional English courses. These courses primarily align with the content they study and focus on the skills they need, a concept known as ESP. It is an approach that ensures ongoing language development while students engage with their subject content, but

it can be demanding as students must balance both academic and language studies simultaneously. This model also creates a bilingual classroom.

### **c-Preparatory Year Model:**

Students in this model must attend an intensive English course, typically for a whole year, before entering universities that offer EMI. The aim is to reduce reliance on the first language (L1) and prepare students for the demand of EMI, ensuring they can fully understand academic content in English. However, it may delay the start of the student's academic degree

### **d-Selection Model:**

The selection model requires a strict English proficiency requirement that is tested through standardised tests such as the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS). Additionally, this model provides no additional language support during studies and allows only limited use of L1 during instruction, ensuring that all the students attending EMI courses have proficiency in English. However, it fails to address language challenges that might arise later, especially with specific English or technical terms. All these models play a significant role in supporting and scaffolding the English language. While they may not fully replace a student's first language (L1), they can create an effective learning environment if used together, like translanguaging.

### **1.3.6 Translanguaging in EMI**

The term translanguaging, derived from the Welsh word *trawsieithu*, was introduced by Cen Williams in the 1990s (as cited in García & Li, 2014). According to him, it represents a bilingual education practice where students fluidly switch between languages for different tasks, such as reading in English and writing in Welsh. Baker (2001) was the first to translate the Welsh term "translanguaging", defining it as the process through which individuals utilise two languages to create meaning, shape experiences, and enhance understanding and knowledge. Williams (2002) further elaborates that, within the educational context, translanguaging refers

to using one language to reinforce another, thereby increasing comprehension and enriching students' engagement in both languages (as cited in Lewis et al., 2012).

While translanguaging might appear similar to codeswitching, the two concepts differ significantly. Codeswitching treats languages as distinct entities, whereas translanguaging acknowledges that people blend parts of different languages to help them express ideas more effectively, understand things more distinctly, or communicate more clearly (García & Li, 2014). It offers a more realistic view of everyday communication, particularly in educational settings and bilingual communities.

Over the years, Translanguaging has proven to be an effective pedagogical practice in a variety of educational contexts, especially where the language of instruction is different from the learners' native languages (Li, 2017). Therefore, Colin Baker (2001) outlines several potential educational advantages of translanguaging. Firstly, it promotes a deeper and more comprehensive understanding of the subject matter, allowing students to grasp concepts more effectively. Furthermore, translanguaging may support the development of the weaker language, boosting learners as they strengthen their skills. It can also facilitate home-school links, creating a more cohesive learning environment. Lastly, this approach can enhance the integration of fluent speakers with early learners, encouraging interaction and collaboration among students at different language proficiency levels.

Additionally, Lu et al. (2023) explain in their systematic analysis of different studies on translanguaging in an EMI context that many teachers hold positive attitudes toward translanguaging. These attitudes are based on their belief that translanguaging supports student learning, improves classroom communication, and boosts students' confidence. Teachers see that when students utilise their full linguistic abilities, they feel more empowered and perform better academically. Moreover, translanguaging allows them to utilise all their linguistic resources to better understand and explain academic content more effectively. This reinforces the value of translanguaging as a practical and beneficial strategy in multilingual

classrooms. Alongside translanguaging, there is also a need for students to learn the kind of English used in their specific fields of study, known as ESP.

### **1.3.7. English for Specific Purposes (ESP)**

ESP is an approach that emerged as part of English Language Teaching (ELT) in the late 1960s, a phenomenon driven by three converging trends. After 1945, the world experienced a surge in scientific, technical, and economic activity, creating a clear demand for a universal language in technology and commerce. As a result of the USA's dominance, English became the universal language. Moreover, as demand was growing, linguists began shifting their focus from traditional grammar to the practical use of English in real-life situations. Furthermore, educational psychologists noticed that learners have different attitudes, needs, and interests, which influence their motivation to learn (Hutchinson & Waters, 1987).

#### **1.3.7.1 Definition and characteristics of ESP**

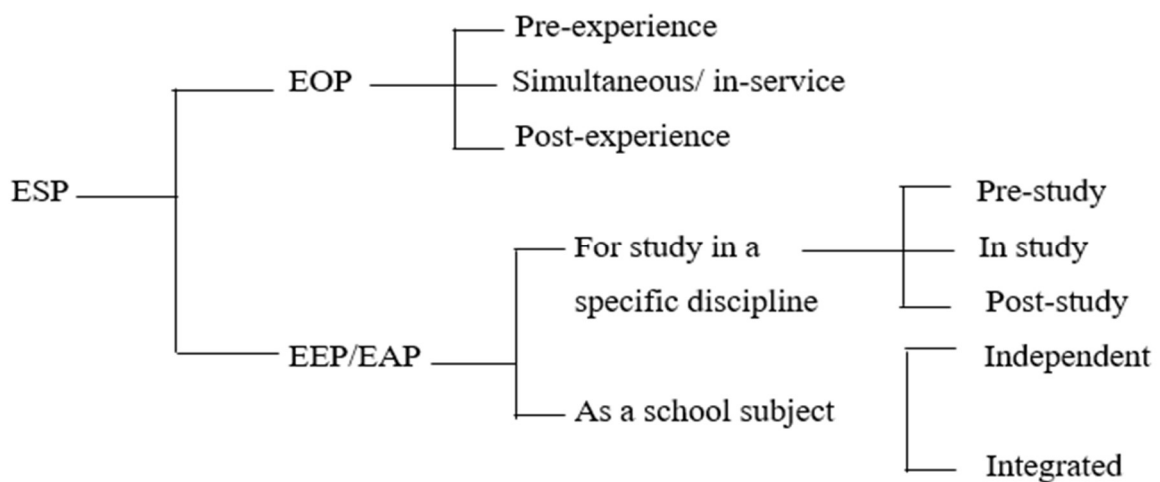
Understanding of ESP requires examining how scholars have approached its scope and objectives over time. Therefore, Hutchinson and Waters (1987) described ESP as an “approach to language teaching which is directed by specific and apparent reasons for learning” (p.19). Additionally, Robinson (1991) introduced two key characteristics: ESP courses are typically constrained by a limited time frame within which specific objectives have to be achieved, and they are taught to adults in homogeneous classes based on their work or specialised studies.

Furthermore, Dudley-Evans and John (1998) argued that this definition might raise some confusion, suggesting that ESP is always directly linked to subject content. He provided a more nuanced definition, indicating that ESP can be understood through a set of absolute and variable characteristics. The absolute characteristics emphasise that ESP is a form of language instruction specifically tailored to learners' specific needs, using methods and language elements relevant to their field of study or work. The variable characteristics highlighted that ESP may be adapted depending on the discipline, teaching context, or learner level. It is usually designed for adults with existing English proficiency, especially those in higher education and the

workplace. However, it can also be modified for younger or beginner learners. These detailed definitions provide a comprehensive picture of what ESP truly entails.

### 1.3.7.2. Classification of ESP

According to Hutchinson and Waters (1987), ESP is a vital branch of the ELT tree. This branch is divided into two main sub-branches: English for Academic Purposes (EAP) and English for Occupational Purposes (EOP). These two branches are then divided into many specialised areas. For instance, under EAP, there are English for Science and Technology (EST), English for Medical Purposes (EMP) and English for Legal Purposes (ELP), among others, within EOP. Some of the key characteristics of the EAP and EOP, particularly regarding timing, are illustrated in Figure 1.3, taken from Robinson (1991, pp. 3-4). The diagram below demonstrates that EAP and EOP occur at different stages; for instance, the pre-experience and the pre-study are more general and serve as foundational support for learners who might not be familiar yet with English. In contrast, the courses delivered alongside or after the study or experience are more specialised



**Figure1.3. ESP Classification by Robinson (1991, p.4)**

### 1.3.7.3. Needs Analysis

Needs analysis is one of the significant parts in designing an ESP course. It is defined as the process that “aims to specify as closely as possible what exactly it is that students have to do through the medium of English”(Robinson,1991, p. 3). According to Hutchinson & Waters (1987), needs analysis is a systematic and

ongoing process of gathering data on students' target and learning needs, analysing the data, and deciding on the appropriate course of study based on the analysis. Target needs refer to what learners need to do to communicate effectively in the target situation. This concept is broken down into three key components:

- **Necessities:** they are what learners have to know (skills and knowledge) in order to function accordingly in the target situation
- **Lacks:** they are what the learners know, highlighting the gap between the target proficiency and the existing learners' proficiency
- **Wants:** these are the personal aims that learners wish to achieve from the language course. They reflect personal expectations and hopes towards acquiring English from the language course.

Learning needs refer to the way learners prefer to learn, including factors such as timing, location, available resources and personal information about the learners. In other words, learning needs are how the learners get from the starting points “lacks” to the destination “necessities”

### 1.3.7.4. ESP Course Design

From the standpoint of Hutchinson and Waters (1987), an ESP course design involves using both theoretical insights and empirical data to create a syllabus, select or develop teaching materials that align with it, determine appropriate teaching methods, and establish assessment procedures to measure learners' progress toward the course's specific objectives. There are numerous approaches in course design, but the authors identified three main types: language-centred, skills-centred, and learning-centred.

- **Language-Centred Approach:** It is the simplest way to develop a course. It is known to the majority of English teachers. Its goal is to connect the analysis of the target situation and the content of the ESP course
- **Skill-Centred Approach:** This process aimed to help learners develop skills and strategies that continue beyond the ESP course by enhancing their information processing (reading strategies, listening techniques, etc.).

In other words, it focuses on the competence that underlies the performance.

- **Learning-Centred Approach:** Instead of simply delivering content based on target needs, the learner's decision and the knowledge they already possess, their motivation, and learning style, determine the learning process completely. The teacher can influence what they teach, but what learners learn is determined by the learners alone.

Therefore, an effective ESP course design depends on a balanced integration of needs analysis, relevant content, and appropriate teaching strategies. guided by approaches that place the learner's context, skills, and learning processes at the centre of instruction.

### 1.3.7.5. ESP contribution to EMI in Higher Education

As EMI continues to expand in higher education worldwide, the need for ESP courses also increases. Therefore, a stronger bridge between the domains of EMI and ESP is needed. As illustrated before, EMI is the learning of content through English, and ESP is an approach to teaching English tailored to learners' needs, which includes the content. However, a new issue arises during this period of Englishization. Because English is widely recognised, many institutions mistakenly assume that students already have the necessary proficiency to enter an EMI program, thus not providing any language help to them. Indeed, Pavesi and Ghia (2020, as cited in Costa and Mastellotto, 2022) argue that English proficiency is often overlooked in the contemporary world, perceived as a basic prerequisite rather than a complex and discipline-specific competence. This perspective is evident in the growing trend in Italian universities to downgrade the teaching of English, as they see it as a fundamental requirement rather than an advanced competence that should be cultivated at the university level.

This highlights the urgent need to integrate ESP into EMI settings, ensuring that students are equipped not only with general English skills but also with the academic and professional language competence required for success in their fields of study. Moreover, Studies such as Costa and Mastellotto (2022) have shown that

integrating language and subject content in the ESP course helped students improve their field-specific communication skills and feel more prepared for EMI tasks, such as writing academic reports.

### 1.4. The Implementation of EMI in Higher Education in Algeria

Algerian society has shown an increasing interest in the English language in recent years, driven by the influence of the media and the Internet, as well as Algeria's connections with English-speaking nations (Belmihoub, 2018c). The former Algerian Minister of Higher Education, Tayeb Bouzid, played a crucial role in advancing EMI, stating that “the French language leads us nowhere”. Then, he instructed the nation’s 77 universities and higher education institutions to transition to English instead of French (Ghanmi, 2019).

By 2023, the Ministry of Higher Education took significant steps to promote the role of English in higher education, issuing comprehensive guidelines for training university teachers in English by the end of the 2022/2023 academic year. These steps include: first, providing English training to 80% of teachers in science and technology fields. Second, ensuring that 100% of teachers in social, human, and medical sciences are trained. Third, using existing intensive English training centres for teacher training. Fourth, providing an online platform for institutions without such centres, starting December 1, 2022. Finally, encouraging institutions with English-proficient staff to begin teaching in English in the academic year 2023/2024 (See Appendix A).

Therefore, the Ministry stated in 2023 that teaching in scientific and technological fields will begin entirely in English, initially with teachers who hold at least a B2 level in English (see Appendix A). All universities were urged to exploit every available resource to achieve a successful implementation. Additionally, the Ministry reaffirmed its commitment in a letter dated March 26, 2025, requesting that universities continue to prepare their teaching staff according to the approved program, with a deadline set for April 17, 2025 (See Appendix A).

### 1.4.1. Algerian Teachers' and Students' Attitudes Toward EMI

It is critical to understand how Algerian teachers and students perceive English in terms of social status or “prestige” to comprehend their willingness to engage with English Medium Instruction (EMI) at universities. When English is viewed positively as a prestigious, valuable language, EMI is more likely to succeed. If not, students and teachers may resist its implementation. Touahmia and Bakar (2024) conducted a study to capture the attitudes of both EMI and non-EMI students and teachers. Regarding students' Attitudes, both EMI and non-EMI students view English as a key tool for personal and professional advancement. They understand its significance for studying abroad and securing international jobs. One student remarked, “English is my passport to international companies” (p.61), travel, and engaging with global content on social media. Moreover, students also described English as a beautiful, simple, and easy language to learn, especially when compared to French.

Concerning teachers' Attitudes, the findings of this study reveal that both EMI and non-EMI lecturers demonstrate positive attitudes toward English, recognising its significance in academia and research. They emphasised its global importance, describing it as “the language of the world” (p.60). They also expressed how important the language is in academic studies, since it dominates science, research, and educational materials, which strongly supports the case of EMI in Algeria. However, some non-EMI lecturers over 50 years old expressed negativity toward English, arguing that it is a complex language to learn and is overvalued, not deserving of its global prestige. They suggested that other languages, such as French, are equally important.

While attitudes towards English and EMI may vary, universities and institutions must look ahead to the needs of the new generation of students, moving beyond the linguistic preferences shaped by past colonial influences. Today's learners view English as a vital key to academic success, global mobility, and career advancement. Therefore, higher education institutions in Algeria should embrace English not only as a tool for internationalisation but also as a language of opportunities that can unlock doors for their students.

### 1.5. Previous Studies Related to the Implementation of EMI in Higher Education

Although EMI has been employed in universities worldwide, previous studies reveal a range of perspectives and outcomes. They highlighted EMI's potential, obstacles that must be addressed. Two studies were conducted in Algeria, highlighting students' and teachers' challenges with EMI and suggesting solutions for them. The first study, undertaken by Khenioui and Boulkroun (2023), investigated the motivation for EMI implementation, the challenges it presents, and some suggested strategies to address these challenges. The research included an online survey aimed at English language specialists from various universities in Algeria. Therefore, they identified globalisation, political dynamics, scientific advancement, pragmatic reasons, economic factors, and the dominance of English as motives behind the implementation of EMI.

Furthermore, the study's findings revealed significant challenges, including low English proficiency among both teachers and students, resistance due to limited language skills, technical concerns, a lack of suitable teaching materials, limited student motivation, and the predominance of French in the academic environment. Other notable obstacles include teachers' age and educational background, that was discussed before by Touahmia and Bakar (2024), the rapid and often unprepared transition to English, the complex coexistence of multiple languages (Classical Arabic, dialectal Arabic, French, and English), as well as time constraints and staffing shortages.

The study proposed several solutions to handle these issues effectively. These include offering comprehensive language training or language support programs for faculty and students. Moreover, developing tailored teaching materials with regular feedback mechanisms, providing online language courses with a focus on oral skills, and organising proficiency-level-specific workshops. Additionally, reducing teachers' workloads, recognising and rewarding educators' efforts, as well as engaging all stakeholders by emphasising the benefits of EMI in enhancing education and research.

The second study, by Ouarniki (2023), aimed to explore the perspectives of Algerian higher education teachers from various fields on the implementation of EMI through semi-structured interviews. Therefore, the findings show that while EMI offers valuable opportunities for enhancing English proficiency and accessing international academic resources, its implementation in Algeria faces significant challenges. Most of the challenges were the same as the previous study, such as the low English proficiency of both teachers and students, which hinders comprehension, instruction, and overall learning outcomes. Additionally, there is a notable lack of English-language teaching materials, insufficient administrative and institutional support, and inadequate teacher training in EMI pedagogy. Teachers emphasised the professional need for development and a strategic, flexible approach to EMI, advocating for a gradual introduction that begins with introductory courses and language support. Moreover, resistance from students, particularly in a French-dominant context, was also noted. Despite these obstacles, teachers recognised EMI's potential to enhance educational quality and global competitiveness.

To ensure an effective EMI implementation in Algerian universities, several key measures are recommended. These consist of providing pre-service and in-service teacher training to enhance language proficiency and pedagogical skills. Additionally, offering English language training for students and staff, and revising curricula to better align with EMI principles. Furthermore, universities should invest in technological support such as online platforms and digital resources, and conduct ongoing research and evaluation to monitor the impact of EMI on teaching and learning outcomes.

Another conducted study was by Sahan and Rose in 2021, aimed to examine how multilingual teaching occurs in English-taught university engineering classes in Turkey, despite official policies that only English is to be used. The findings indicated that teachers and researchers should ensure that EMI stakeholders perceive translanguaging practices as a valuable tool for successful education. This is especially relevant when the outcomes of curricula centre on the learning of subject knowledge, rather than the English language, as is the case for most EMI contexts.

### 1.6. Conclusion

This chapter provided a comprehensive overview of the essential literature regarding EMI in Algeria. It underscored the influence of various colonisation phases on the linguistic landscape of Algerians, ultimately leading to a robust Arabization movement. This Arabization effort supported and pushed English to become the first foreign language in Algeria, but ultimately failed. However, after the spread of Englishization around the world, the landscape changed dramatically, and Algerian universities adopted EMI. Therefore, this chapter thoroughly examined EMI, covering key definitions, benefits, types, and the challenges encountered. In addition, the chapter also delved into models for language support, translanguaging, and ESP, all in relation to EMI. Another important point was discussed, specifically the implementation of EMI in Algeria, focusing on the teachers' and students' attitudes towards it. Furthermore, the chapter reviewed some previous studies conducted, which highlighted the challenges faced by students and teachers, plus some suggested solutions for future development.

**Chapter Two:**  
**Research Methodology,**  
**Data Analysis, and**  
**Interpretation**



2.1. Introduction.....	33
2.2. Situational Analysis.....	33
2.3. Research Design.....	34
2.4. Sampling.....	35
2.5. Data Collection.....	35
2.5.1. Classroom Observation.....	36
2.5.2. Interview.....	37
2.5.3. Questionnaire.....	39
2.6. Data Analysis.....	40
2.6.1. Classroom Observation Results.....	41
2.6.1.1. Teachers' Performance.....	41
2.6.1.2. Learners' Behaviour.....	42
2.6.2. Teachers' Interview.....	42
2.6.3. Students' Questionnaire Results.....	46
2.7. The Interpretation and the Discussion of the Data.....	63
2.8. Recommendations.....	65
2.8.1. Recommendations for the Ministry of Higher Education.....	66
2.8.2. Recommendation for the Department of Mathematics.....	66
2.10. Conclusion.....	67

### 2.1. Introduction

This chapter presents the practical part of this study, which is an investigation of the teachers' and the learners' opinions, struggles, and suggestions regarding the implementation of English as a medium of instruction in the Department of Mathematics. The chapter is divided into two sections. The first one focuses on the description of the study setting, the research design, the sample population involved in the study, and the instrument used to gather information. The second section emphasises the analysis of the data, along with its interpretation and limitations, while also highlighting the researcher's suggestions and recommendations.

### 2.2. Situational Analysis

The English language has consistently been an integral component of educational programs in Algeria, from primary school to high school, thereby enhancing students' awareness of its significance in society. Therefore, at Tlemcen University, almost all the departments devote one session each week to English. In 2023, the Ministry of Higher Education introduced English as a medium of instruction in scientific fields. Most teachers and students embraced this policy due to the importance of the language in their disciplines, leading to the adaptation of English in teaching. This change also applies to the Department of Mathematics. (See Appendix A)

This research was conducted in the Department of Mathematics at Tlemcen University, which began teaching higher mathematics in 1974. The department, initially staffed with Algerian teachers and French cooperants, underwent institutional changes. In 1995, it became an independent Institute of Mathematics and was reorganised as a department within the Faculty of Sciences. As of 2025, the department includes 96 teachers and around 300 students (Université Abou Bekr Belkaid, n.d).

Before 2023, the Department of Mathematics devoted one session of technical English exclusively to second-year Master's students, which focused on teaching the four skills with the use of specialised texts and exercises. It aimed to read and write research papers effectively, communicate ideas clearly, and collaborate with

international experts. After 2023, the Minister imposed teachers with good English proficiency to utilise EMI, and the department encouraged its teachers to implement it; however, most teachers preferred using French despite the instruction. Moreover, the department provided the students with an online session for the English language in the first semester, which mainly consisted of a list of vocabulary of some mathematical terms, expressions, Greek letters, and exercises focused on translation, fill-in-the-gaps, and reading exercises (See Appendix B).

### 2.3. Research Design

To effectively conduct research, a researcher needs a plan that outlines and guides the entire study (from collecting data to interpreting it), including its design. Therefore, the research design segment, often referred to simply as "design," explains the overall structural framework used in the study. Several designs are available, each suited to a specific research context and questions. Each design has its advantages and limitations, depending on how effectively the data addresses the research questions (Perry, 2011).

In addition, Cohen et al. (2007) explained that “the purposes of the research determine the methodology and design of the research” (p. 78). Thus, this research aimed at investigating the implementation of EMI in the Department of Mathematics at the University of Tlemcen. It sought to explore the insights gained from teachers and students regarding their experiences with EMI, and to identify potential challenges. The findings from this study will contribute to the existing literature on EMI in mathematics education and provide valuable recommendations. Following Yin's (2003) claims, an exploratory case study was deemed appropriate for the present study.

A case study examines a single instance of a category of objects or entities within its natural context (Nunan, 1992), providing insight into the uniqueness and complexity of a single case, while exploring its function within significant circumstances (Stake, 1995). As a result, this research adopted a case study design that focused on first-year mathematics students. These students were chosen because they were navigating the transition from high school to university. Additionally, they

are directly involved in implementing the English language in their field. After outlining the research design employed in this study, the following section explains how the sample population was selected

### 2.4. Sampling

Sampling is the process of selecting a small group of individuals from a larger population to estimate or predict the characteristics of the entire population (Kumar, 2014). This method is crucial in research because it allows reliable data collection without the need to study the entire population. Sampling can be categorised into two main types: probability sampling and non-probability sampling. In this study, the researcher used probability sampling, more specifically, simple random sampling. In simple random sampling, every unit in the population has an equal probability of being included in the sample (Mackey & Gass, 2015). This ensures that the sample is representative of the population as a whole, which is crucial for the validity of statistical inferences (Cochran, 1991).

In this study, a sample of 59 students was randomly selected from four groups of first-year students (L1), comprising a total of 117 students. According to the results from the first and second questions of the given questionnaire, 85% of the students were females and 15% were males. Most of the students were aged between 17 and 20 years (90%), while a smaller portion was aged between 21 and 30 years. In addition, the sample consisted of five female teachers aged between 45 and 56 years. All of them have substantial experience in the field, ranging from 15 to 30 years of experience. Due to their varying experiences, their ranks differ: one holds the MCB (Maître de Conference class B) rank, two hold the MCA (Maître de Conference class A) rank, and the remaining two hold the MAA (Maître Assistant class A) rank.

Once the sample had been determined, the data collection part is explained below.

### 2.5. Data Collection

Data collection is an important process in research used to gather information for analysis. It involves the methods and techniques used to gather information about

a specific situation, phenomenon, issue, or group of people (Kumar, 2014). These methods can be categorised into qualitative, quantitative, and mixed-methods approaches. For this present study, the mixed-methods approach was the most suitable, as it is a flexible approach allowing the researcher to collect both numeric and narrative data, providing generalisable results. Traditionally, a case study is considered a qualitative research design (Stake, 1995). However, novice researchers argue that case studies can employ qualitative, quantitative, or mixed-methods approaches, depending on the research questions and objectives (Yin, 2017 ; Bell & Warren, 2023).

To ensure the validity, credibility and accuracy of the collected data, this study employed triangulation by using three research instruments: classroom observation, interviews with teachers, and questionnaires for students. Triangulation involves using multiple instruments for data collection in a study to minimise bias and improve data accuracy (Cohen et al., 2007). The first instrument used in this research was classroom observation. The latter was conducted after the Head of the Department of Mathematics granted permission for the researcher to access the necessary classes, conduct interviews with the teachers, and distribute a questionnaire to students (See Appendix C).

### **2.5.1. Classroom Observation**

Observation is a tool for collecting data by systematically watching and listening to interactions or events as they happen (Kumar, 2014). Therefore, Cohen et al. (2007) claim that observation in research offers the advantage of collecting real-time data from natural settings, allowing researchers to witness events firsthand. This direct access yields more valid and authentic data compared to methods that rely on interpretation or second-hand reports. The immediacy of observation makes it a powerful research tool (Cohen et al., 2007), making it the perfect choice for revealing the complexities within EMI classes in the Department of Mathematics. Moreover, there are two types of observation: participant and non-participant observation. Participant observation involves the observer taking part in the activities or interactions under investigation, whereas in non-participant observation, the observer

does not participate in the observed situation (Cohen et al., 2007; Kumar, 2010; Perry, 2011). The non-participant classroom observation is the most suitable method for this study, as it allows for an objective analysis of the classroom dynamics.

Observation can occur in various settings, including classrooms, providing valuable insights into educational practices. In this study, the researcher conducted four non-participant classroom observations with four different teachers while mostly observing the same students in their natural setting in order to achieve more objective results. An observation grid was adapted based on the work of Miranda et al., (2021, p.5). It was divided into two criteria: the teachers' performance and the students' behaviour. The criteria for teachers' performance focused on the medium of instruction used, the teaching practices employed to support EMI, and the availability of adequate EMI resources. The criteria for learners' behaviour focused on the medium of participation and their ability to comprehend the instructions in English. (See Appendix D)

### 2.5.2. Interview

The interview is one of the qualitative tools recommended by Yin (2003) since it provides profound insights into human experiences. It is a structured and purposeful conversation defined and controlled by the researcher (Kvale, 1996). There are three types of interviews: structured, unstructured, and semi-structured interviews. In the present research, a semi-structured interview was conducted with five teachers to gather their opinions and experiences regarding the new implementation of English as a medium of instruction. Four teachers used the EMI in the first and second semesters, and one switched to French in the second semester.

Three interviews were conducted in person, and two were conducted over the phone according to the interviewees' preferences. Each interview lasted about 15 to 20 minutes. The interviews took place in different settings, primarily in empty classes within the Mathematics Department. Most interviewees consented to have their answers recorded, except for two teachers who preferred not to be recorded and allowed the researcher sufficient time to write down their answers. The interview was divided into two parts (See Appendix E). While the first covered the teachers'

personal background information, the second focused on their experiences, challenges, opinions, and suggestions related to the implementation of EMI. Therefore, the first part consisted of one question that provided context about the interviewees, helping to understand their perspective and experiences about the topic. The second part consisted of 7 questions, which are:

**Table 2.1. The Aims of the Interview Questions**

<b>The question</b>	<b>Its aim</b>
Did you receive any training on the application of EMI? If so, could you please elaborate on the nature of that training?	This question aimed to find whether the interviewees have received any training on EMI, as it could influence their confidence, teaching strategies, and ability to adapt to the transition.
What is your perspective on the transition from using French to English as the medium of instruction in higher education?	This question explored the interviewees' perspective on the transition from French to English
how often do you use English as a medium of instruction in your classroom? What is your level of comfort in teaching in English?	This question was divided into two sections. They provided valuable insight on how frequently the interviewee used EMI and their level of comfort, which helped assess their confidence and preparedness.
What challenges do you face when using EMI?	This question aimed to identify the difficulties teachers encounter when using EMI, helping to understand the barriers that may affect their teaching effectiveness.
In which areas do your students experience the most significant difficulties? What strategies do you use when encountering these circumstances?	This question aimed to identify the challenges the students encounter in an EMI context and provided insight into an effective support mechanism for them.
In your opinion, what benefits does the implementation of English bring to the field of mathematics?	This question explored the benefits of using English in mathematics, highlighting its impact on learning and academic success.
What do you think could be done to make it easier for both teachers and students to use English effectively in the classroom?	This question aimed at emphasising the suggestion from teachers to enhance the experience for both themselves and their students

To complement the data obtained from the interviews, a questionnaire was also utilised.

### 2.5.3. Questionnaire

Questionnaires are a commonly used tool for data collection. It is defined by Kumar (2014) as “a written list of questions, the answers to which are recorded by respondents” (p.145). The questionnaire can be presented in either paper or online form (Perry, 2011). Moreover, the questions in the questionnaire can be closed-ended or open-ended. Close-ended questions restrict responses to fixed options, like agreeing or disagreeing, while open-ended questions allow for free expression (Nunan, 1992). This enables the collection of both qualitative and quantitative data, providing more comprehensive insights and more reliable information.

For this study, the questionnaire was directed to first-year mathematics students (L1) and aimed to gather the learners’ perspective on the use of EMI. It focused on their opinions about how EMI is affecting them, the challenges they encounter, and their suggestion for a better learning experience. It was administered both online (via Google Forms) and in paper form to cover the largest sample possible. It consisted of 20 questions, ranging from yes/no questions to multiple-choice and open-ended questions. (See Appendix F)

- The first four questions focused on background information of the students to better understand their characteristics.
- Question five aimed at identifying the frequent use of English by the teacher.
- Questions 6 and 7 highlighted whether the teacher used any languages other than English and if switching to other languages helped the students understand the lessons.
- Questions 8 and 9 aimed at finding the language in which students feel most comfortable when the teacher used it, and whether they had any difficulties understanding the lectures in English.

- Question 10 aimed to understand whether the students felt that their English proficiency affected their ability to comprehend the lessons delivered in English.
- Question 11 sought to identify whether the English course assigned to the students was efficient or not.
- Questions 12, 13, and 14 attempted to understand if the learners were confident using English, how often they used it, and if they preferred using different languages rather than English.
- Questions 15 and 16 focused on the students' avoidance of participation and asking questions in English in the classroom.
- Questions 17 and 18 shed light on the language used by students to write notes and answer exams.
- Question 19 aimed to determine whether students believed that using English would help them in their field and future studies.
- Question 20 aimed to highlight the students' suggestions about developing and using EMI in their fields to make their learning experience efficient and effective.

After collecting the data, the next crucial step is to analyse it.

### 2.6. Data Analysis

According to Nunan (1992), data analysis is the structured application of statistical and logical techniques to interpret data. It is categorised into qualitative analysis, which focuses on non-numerical data, and quantitative analysis, which utilises statistical tools. The present study collected data through observation, interviews, and questionnaires, which were analysed using both qualitative and quantitative methods. The results of each instrument are explained in the following sections, starting with the observation.

### 2.6.1. Classroom Observation Results

As previously mentioned, the researcher observed four L1 teachers in the mathematics department who were known for using EMI. These observations focused on teachers' performance and learners' behaviours. The results of each aspect are explained below.

#### 2.6.1.1. Teachers' Performance

Concerning the use of English as the primary medium of instruction, the observer noticed that most teachers used English to present rules, write on the board, and for reading activities. However, only two communicated freely in English while the other two relied heavily on French. The first two teachers displayed confidence in their English usage, demonstrating good pronunciation and a strong vocabulary. In contrast, the other two teachers seemed hesitant to use the language and struggled to retrieve the necessary vocabulary when needed. Additionally, all the teachers felt the need to switch and translate everything they said from English into French or Arabic, due to the students' low proficiency in these languages. The observer witnessed translanguaging from most teachers, who would often say something in English and immediately translate it into French, followed by either standard Arabic or dialectal Arabic.

Moreover, the teachers' teaching methods varied. They utilised body language, eye contact, and constant problem-solving questions to engage learners. Two teachers even included humour to create a lively classroom atmosphere. Regarding EMI, one teacher encouraged students to use English by demonstrating how to formulate answers to exercises and asked them to search for the meanings of certain words. Another teacher continuously reminded the students of the vocabulary they had learned and gave them advice on counting and how to use commas and periods in numbers. However, the other two teachers showed little interest in the language that their students used. Additionally, when providing feedback, all four teachers responded in the language students used for their questions, which was often the dialectal Arabic. Concerning EMI resources, all teachers provided lessons in both Portable Document Format (PDF) printed forms, and some even offered a French

version. In the classrooms, a visual aid was utilised to support EMI, which was a data show.

### 2.6.1.2. Learners' Behaviour

Regarding the behaviour of the learners, the observer noted their usage of the English language. They rarely used English for participation and refrained from doing so, except for one occasion when the teacher repeatedly asked them in English. Some of them felt compelled to answer in English. Overall, the learners were not motivated to answer in any language, despite the teachers' efforts, and remained passive. Most students hesitated to use English and preferred dialectal Arabic and French during participation and collaboration.

Concerning the learners' comprehension of courses taught in English, it was challenging to assess their understanding since the teachers translated all the English words they used into French or Arabic. However, the learners became familiar with some vocabulary that the teacher did not need to translate, such as: 'is continuous over', 'is derivable over', 'the function', 'proof', 'show that', etc. Finally, the learners used English in their notes, as most of them copied the explanations from the board, which were written in English. The upcoming section is devoted to the analysis of the interviews.

### 2.6.2. Teachers' Interview

The analysis of the teachers' interviews is divided into two parts, as mentioned before. The researcher interviewed four previously observed teachers and added a fifth teacher who switched back to French in the second semester. The teachers are coded as teachers A, B, C, D, and E for reference.

#### First part

#### **Question 1: Background Information**

The interviewees consisted of five female university instructors, aged between 45 and 56 years. Regarding their ranks, two teachers hold the MCA rank, two hold the MAA rank, and one holds the MCB rank. Moreover, these teachers have considerable experience, ranging from 15 to 30 years in university, each teaching

different modules. Therefore, teacher A taught three modules: calculus, systems control, and technical English (for Master's level). Teacher B also taught calculus, while teacher C taught statistics. Besides, teacher D covered mechanics and electricity, and finally, teacher E taught the machine framework module.

### **Second part**

#### **Question 2: Training Experience**

Teacher A reported that she learnt the English language just by listening to it, but she also attended the intensive training at the “Centre d'Enseignement Intensif des Langues” (CEIL) centre. However, she left the program because it focused solely on grammar and general English, stating, “It was absolutely not useful for scientific and technical English”. Similarly, teacher B learnt vocabulary by herself and attended training at the CEIL centre, which focused on sentence structure. Nevertheless, she had to withdraw due to her busy schedule. Moreover, teacher C was a special case; she had studied in the English department before moving into the mathematics field. She attended the CEIL training, but unfortunately, as it focused on general English, it was not helpful. Furthermore, teacher D made efforts to improve her skills by studying in both private lessons and the CEIL training, which focused on grammar and communication. Lastly, teacher E had private training that concentrated mainly on pronunciation and communication.

#### **Question 3: Perspectives of Teachers Toward the Transition from French to English**

4 out of 5 (80%) teachers supported the transition, acknowledging the importance of the English language; however, one of the four teachers expressed concern about the rapid transition that may negatively affect both teachers and learners. Additionally, the teacher who did not support the transition (Teacher B) explained that students are already struggling with mathematics, and introducing a new language for communication would only exacerbate the situation. She suggested postponing the transition until the Master's level.

### **Question 4: Frequency of EMI Use and the Teachers' Comfort Level While Using It**

Teacher A, C, and D expressed that they limited their use of English, taking into account their students' understanding to ensure lessons are comprehensible. Teacher B mentioned that she sometimes used it, mostly on the board, to prepare learners for exams conducted in English. Finally, teacher E initially used English in the first semester. However, she switched back to French in the second semester because she got tired of translating into French rather than into dialectal Arabic. Additionally, she had to create two versions of each exam: one in English and another in French, with most students opting for the French version. Regarding comfort levels, two teachers (A and C) expressed confidence in using the English language. In contrast, teachers D and E expressed discomfort, with teacher D arguing that she was "not ready yet" for the transition but still optimistic about learning. Teacher B, however, mentioned that her comfort does not matter to her as much as her students' comfort.

### **Question 5: Challenges When Using EMI in the Classroom**

Most of the teachers struggled with speaking skills, particularly pronunciation, as highlighted by teachers B, C, and E. In addition, teachers C and D also struggled with constant translation into French, which can lead to mixing up words. Therefore, teacher D's biggest challenge was when she was put on the spot; her mind went blank, affecting her vocabulary. In contrast, teacher A did not struggle with the language itself; instead, her biggest challenge was her students' low English level.

### **Question 6: Student Challenges with EMI and Teaching Strategies for Encountering These Challenges**

One of the biggest challenges that students encountered was a lack of understanding of the language in general, more precisely, technical English, as stated by teachers A, C, D, and E. Therefore, teacher C explained that translating the knowledge that students already grasped from high school into another language within a short period was challenging. Additionally, teacher B mentioned that students struggled with their productive skills, particularly speaking and writing.

Producing the language, whether through speaking or writing, was demanding. Teachers A and E highlighted that this challenge was particularly pronounced in writing since it affected students' exam grades.

To help their students, teachers employed many strategies. The dominant strategy that all teachers (100 %) used was translation. All teachers demonstrated that they translated the word or phrase from English to French, and when necessary, they also provided translations into dialectal Arabic for added clarity. Teacher C explained that she tried to build the students' confidence by clarifying to them that English was not a phonetic language and it was perfectly acceptable to mispronounce words.

### **Question 7: Benefits of the Implementation of English in the Field of Mathematics.**

All teachers (100%) emphasised the critical role of the English language as an international language through which the world communicates, and the language of science that opens the window to all the knowledge contained in research, books, and articles, making it significant for future research

### **Question 8: Teachers' Suggestions to Enhance Effective English Use in the Classroom for Both Teachers and Students.**

Teachers responded differently to this question, offering a range of insights. Teacher A suggested enforcing the implementation because this will compel the learners to learn the language, especially since, as she mentioned, they do not master any language other than dialectal Arabic. This will also require teachers to put in considerable effort. Teacher B, on the other hand, proposed training students in the English language before they enter university, either through specialised training or by teaching ESP in high school. She also believed that teachers need training in both general and technical English. Then, teachers C and E emphasised the necessity of technical English training for both teachers and students. However, teacher C advocated using Arabic as the medium of instruction, stating "No society develops with the language of others" and suggested leaving English as an additional language for future research. Additionally, teacher D thought that the administration should

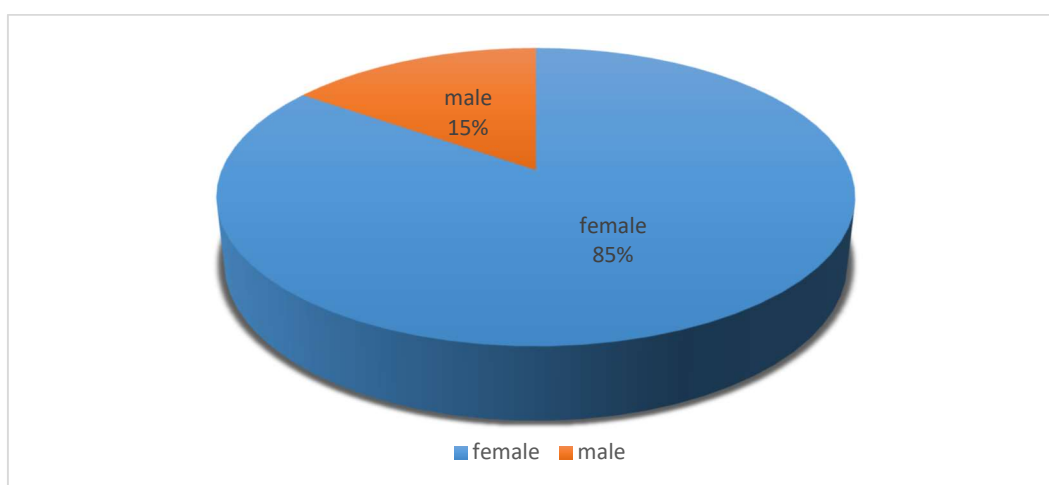
either require the students to attend English courses or transition to English gradually. Similarly, teacher E also suggested language training for both teachers and students.

Following the teachers' interviews, the students' questionnaires were also analysed.

### 2.6.3. Students' Questionnaire Results

#### Question 1: Students' Gender

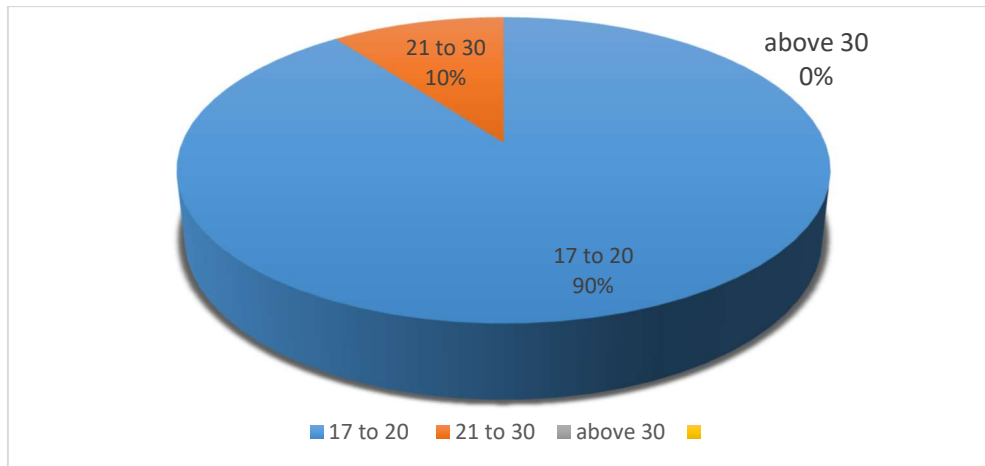
As demonstrated in Figure 2.1 below, there was a significant gender imbalance, with 85% of students identifying as female and 15% identifying as male.



**Figure 2.1. Students' Gender**

#### Question 2: Students' Age.

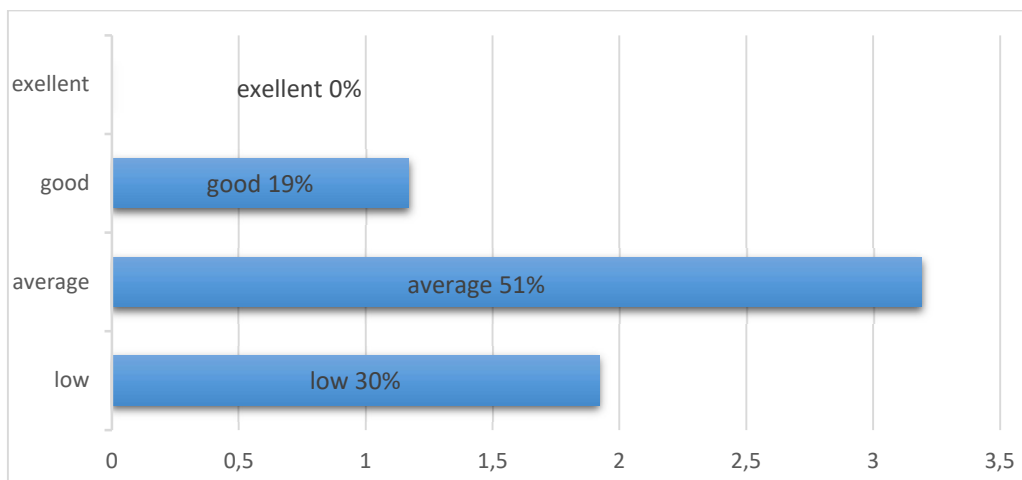
Most students participating in this study fall within the age range of 17 to 20, representing 90% of the participants. The remaining 10% were within the age range of 21 to 30, with no student exceeding 30 years of age.



**Figure 2.2. Students' Age Range**

### Question 3: Students' English Level

In this question, the students self-evaluated their English level. Therefore, the results revealed that a majority of 51% classified their skills as average, and 30% ranked their English level as low. While 19% ranked themselves as good, no student considered their level excellent.

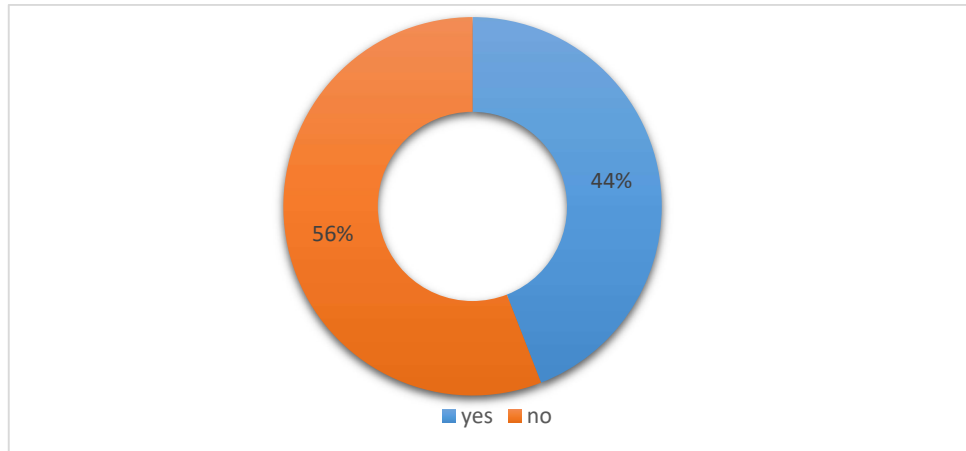


**Figure 2.3. Students' English level**

### Question 4: Students' Training Experience in English

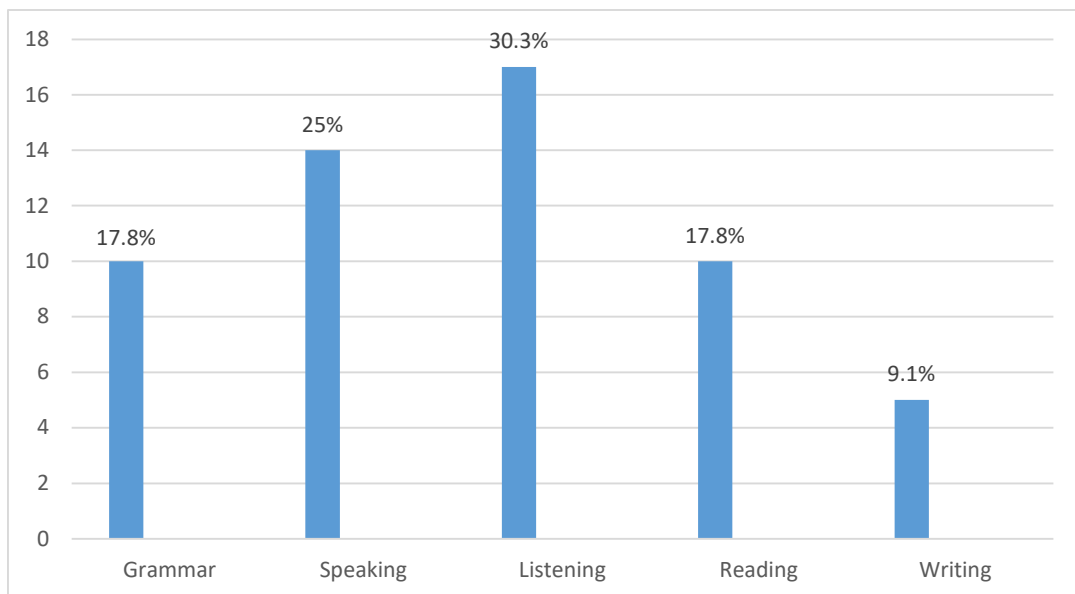
This question showed that 33 students (56%) had no training experience in English, while the remaining 26 students (44%) did. All 26 students explained their training focus, which was varied, and was captured through a multiple-choice question that allowed them to select multiple answers. Since multiple selections were allowed, each option's percentage is calculated based on the total number of responses

per item, not the total number of participants. The researcher provided five choices: listening, speaking, writing, reading skills, and grammar.



**Figure 2.4. Students' Training Experience**

Figure 2.5 highlights the skill that the students' training mainly focused on, specifically listening, accounting for 30.3% of the total number of choices, followed closely by speaking, with 25%. After that, both grammar and reading skills were selected 10 times, with a percentage of 17.8%. Lastly, writing was the least selected option at 9.1%.



**Figure 2.5. Students' Training Experience Focus**

To illustrate the main areas emphasised during the students' training, Table 2.2 presents the specific English skills each student focused on. It shows how many

students received training in one skill, two skills, or more. This table helps determine how thoroughly different language skills were covered during the training.

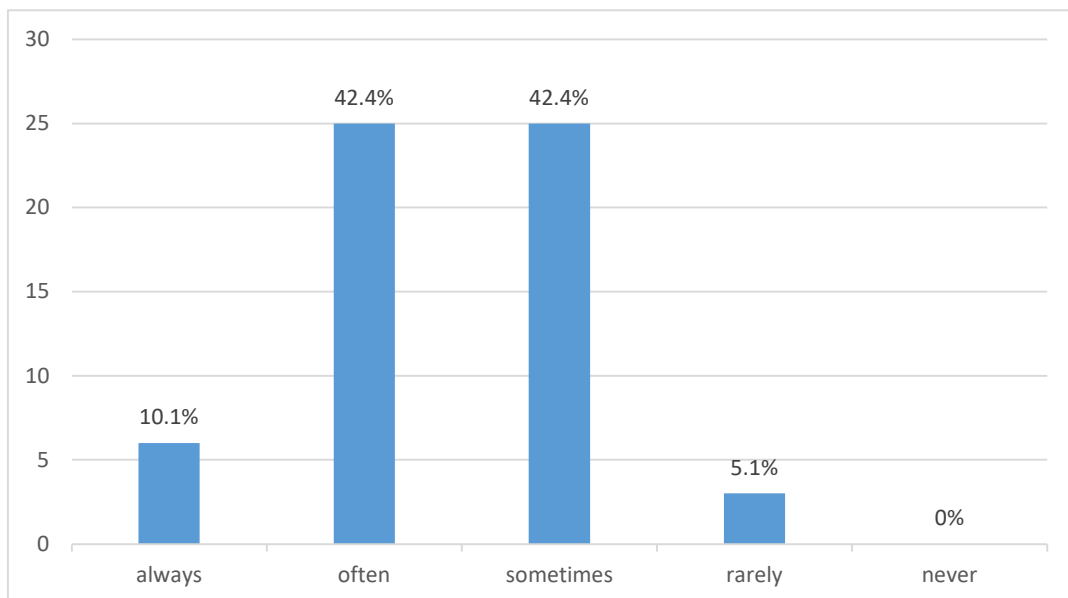
**Table 2.2. The Students' English Training Coverage of Different Skills**

	Grammar	Speaking	Listening	Reading	Writing
1	1				
2		1			
3		1			
4			1		
5			1		
6			1		
7			1		
8				1	
9				1	
10	1	1			
11	1	1			
12	1	1			
13		1	1		
14		1	1		
15		1	1		
16			1	1	
17			1	1	
18	1	1	1		
19	1	1	1		
20	1		1		1
21			1	1	1
22		1	1	1	
23	1	1	1	1	
24		1	1	1	1
25	1	1	1	1	1
26	1	1	1	1	1
	10	15	18	10	5

Table 2.2 demonstrates that not all the training sessions attended by the learners covered all the necessary skills. Only 4 out of 26 students who attended training had full or nearly complete coverage of the necessary skills. In contrast, the training for the remaining 22 students consisted only of 1 to 3 skills.

### **Question 5: Teachers' Usage of English in the Classroom.**

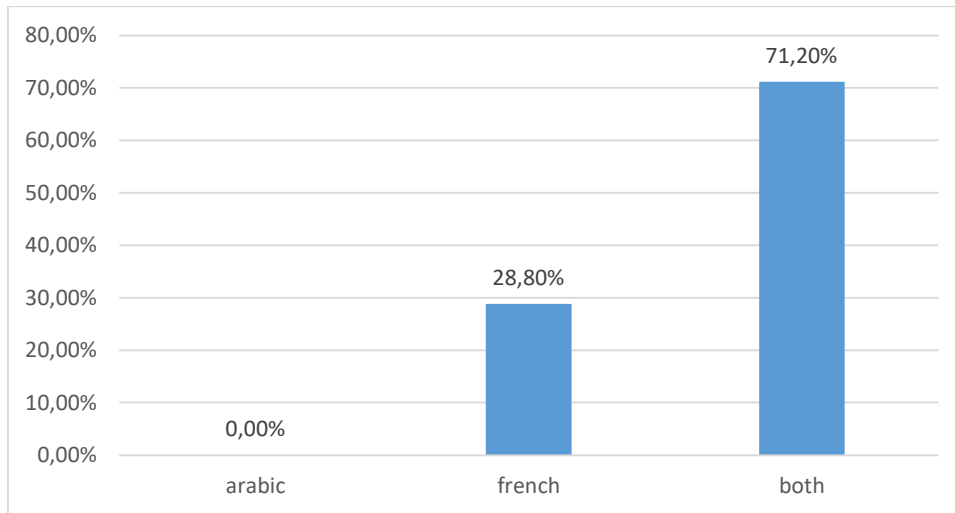
As shown in Figure 2.6 below, the findings demonstrated that only 10.1% of the students reported that their teachers always used English in their instruction. Therefore, a significant 42.4% of students noted that their teachers often employed English, while an equal percentage (42.4%) said that the teachers sometimes incorporated the language into their lessons. On the other hand, 5.1% reported that their teachers rarely used English. Importantly, no students said that their teachers never utilised English in their teaching.



**Figure 2.6. The Frequency of Teachers' Usage of English in the Classroom**

### **Question 6: Other Languages Used by the Teachers**

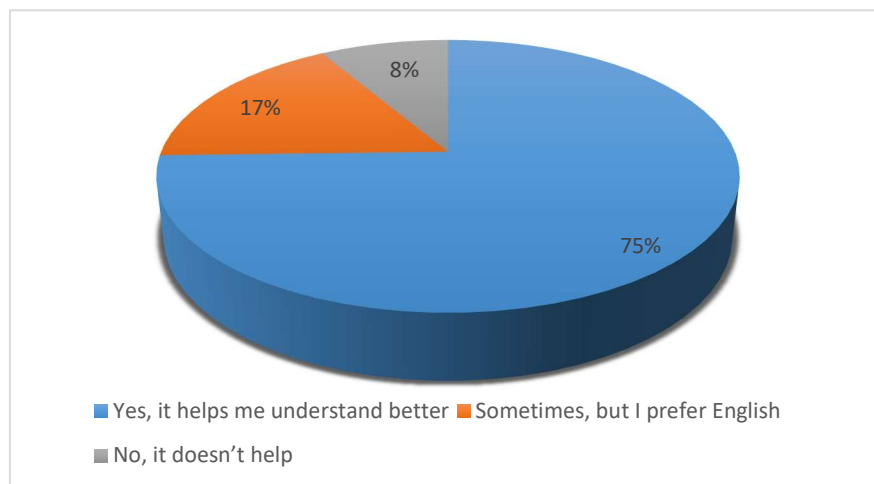
According to Figure 2.7, 28.8% of the students claimed that their teachers used French only in the classroom, while none reported that their teachers used Arabic only. However, a great majority, representing 71.2% of the students, believed that their teachers used both Arabic and French during instruction.



**Figure 2.7. Languages Used by the Teacher Other than English**

**Question 7: The Usefulness of Using Languages Other than English**

The results below, shown in Figure 2.8, indicate that the majority of students (75%) believed that teachers switching to other languages in the classrooms helps them better understand. While 17% reported that this switching is sometimes helpful, but they still prefer English as the primary medium of instruction. additionally, only 8% of the students noted that switching to other languages was not helpful

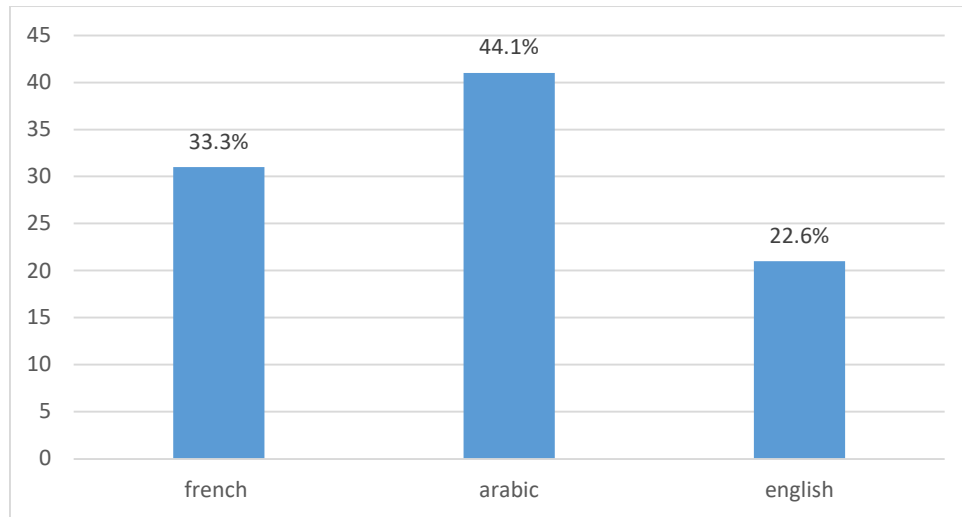


**Figure 2.8. The Usefulness of Using Languages Other than English**

**Question 8: The Language that the Students Are Mostly Comfortable with as an Instructional Language.**

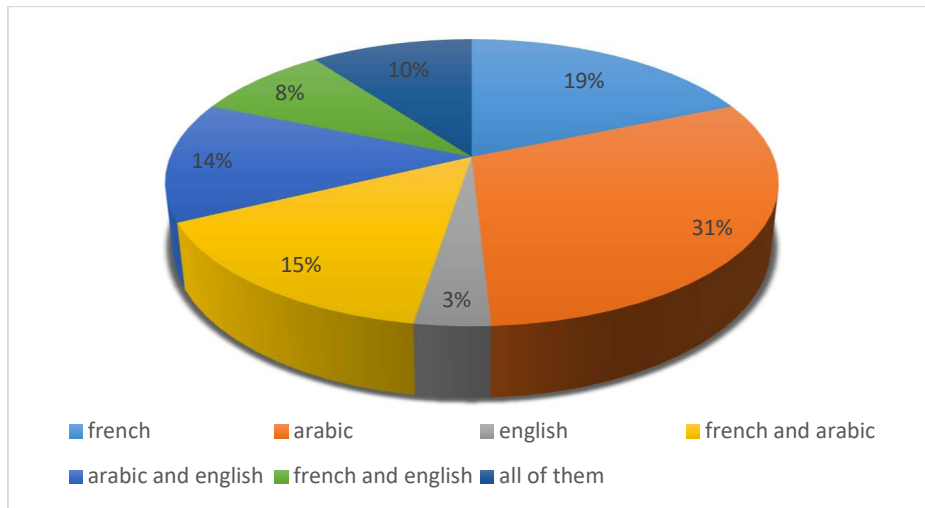
This question is a multiple-choice question that allows multiple selections; thus, the percentages reflect the proportion of selections per item, not per individual.

A total of 59 students selected 93 choices. Therefore, the findings showed the frequency with which students chose each language, whether individually or in combination with another language. Moreover, a significant 44.1% of the choices were the Arabic language as the most comfortable instructional language, followed by French with 33.3%. In comparison, English was selected in 22.6% of the total responses, as shown in Figure 2.9.



**Figure 2.9. The Language that the Students Are Mostly Comfortable with as an Instructional Language**

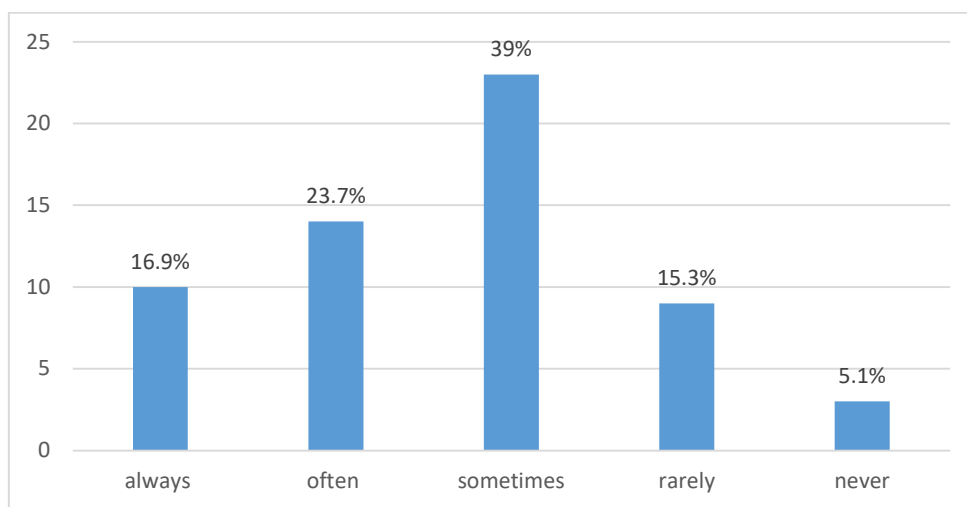
According to the results in Figure 2.10, 31% of students expressed comfort in using only the Arabic language as an instruction language. However, only 3% expressed comfort towards English as a medium of instruction. Then, French held a middle ground with 19% of the students' voices as the only instructional language. Additionally, 10% of the students reported that using all three languages was more comfortable. Furthermore, 15% chose the combination of French and Arabic, while 14% preferred a mix of Arabic and English. Lastly, the least selected combination at only 8% is French and English.



**Figure 2.10. The Languages that the Students Are More Comfortable with as Instructional Languages**

**Question 9: Frequency of Difficulties in Understanding English-Medium Lectures.**

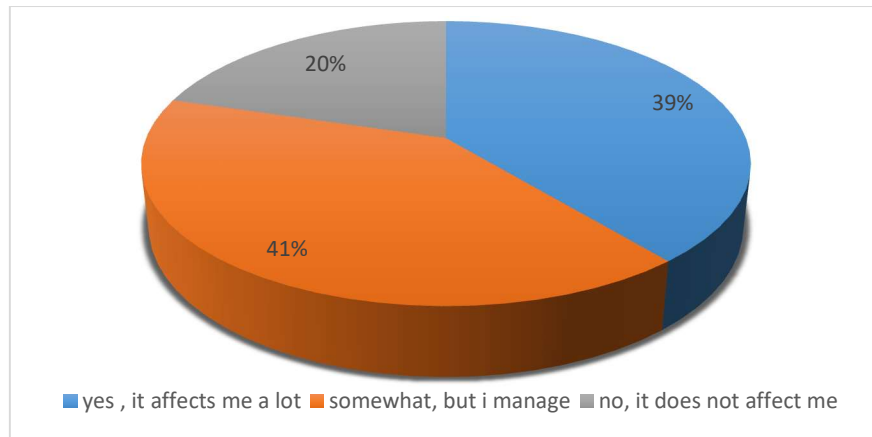
As illustrated in Figure 2.11, 39% of the students sometimes found it difficult to understand lectures in English. Additionally, 23.7% often faced difficulties comprehending lectures in English, while 16.9% always struggled to understand the materials in English. On the other hand, 15.3% rarely faced issues with English as a medium of instruction, and only 5.1% reported never experiencing any difficulties with the English language.



**Figure 2.11. Frequency of Difficulties in Understanding English-Medium Lectures**

### Question 10: The Impact of English Proficiency on Lesson Comprehension

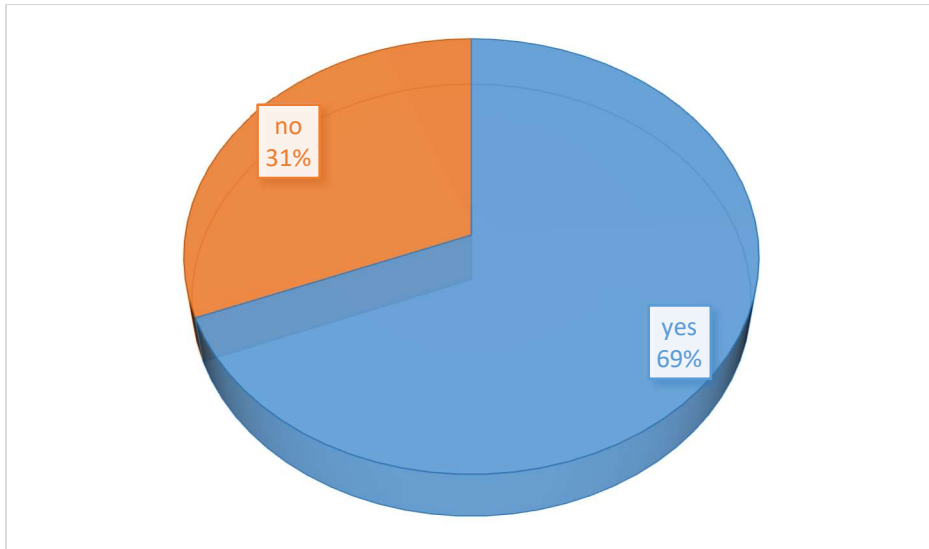
Figure 2.12. indicates that 39% of the students expressed that their current English level did affect their ability to follow the lessons. Moreover, 41% said that their current English level somewhat affected their understanding, but they still managed to keep up. In contrast, only 20% felt that their English level had no impact on their comprehension.



**Figure 2.12. Impact of English Proficiency on Lesson Comprehension**

### Question 11: The Usefulness of the Assigned English Course.

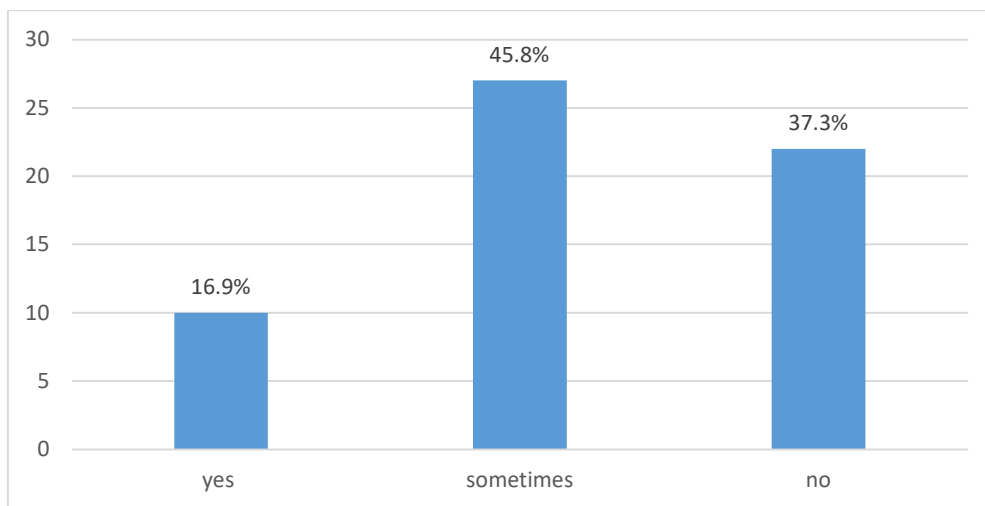
In this question, one participant did not provide an answer. Therefore, Figure 2.13 demonstrates that 40 students (69%) reported that the assigned English course was helpful. In contrast, only 18 students (31%) reported that the course was not helpful. Besides, 8 students out of the last 18 students explained why the course was not helpful. One student said that the course relied heavily on memorisation, another pointed out that the online sessions were not of poor quality, and one student expressed his/her struggles with the English language. The remaining 5 students stated that they had no assigned English course.



**Figure 2.13. The Usefulness of the Assigned English Course**

**Question 12: Students’ Confidence in Using English in the Classroom.**

16.9% of students expressed confidence in using English in the classroom. Furthermore, a significant 45.8% of students reported sometimes feeling confident when using English, while 37.3% indicated that they were not confident, as shown in Figure 2.14.

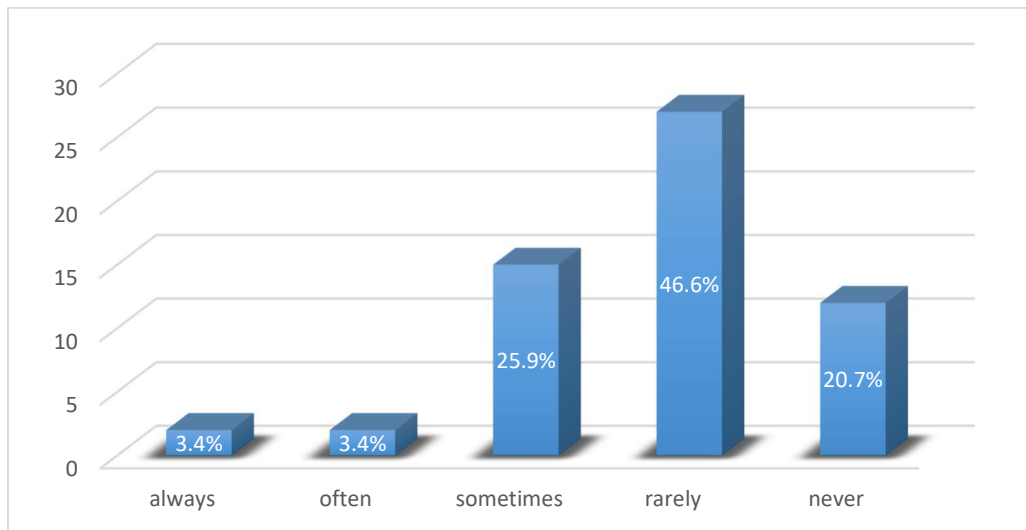


**Figure 2.14. Students’ Confidence in Using English in the Classroom.**

**Question 13: Frequency of English Use in Classroom Participation.**

One person did not participate in this question. According to the findings, 20.7% of the students never used English to participate in class. Furthermore, the majority of students, at 46.6%, rarely engaged in English as a medium of

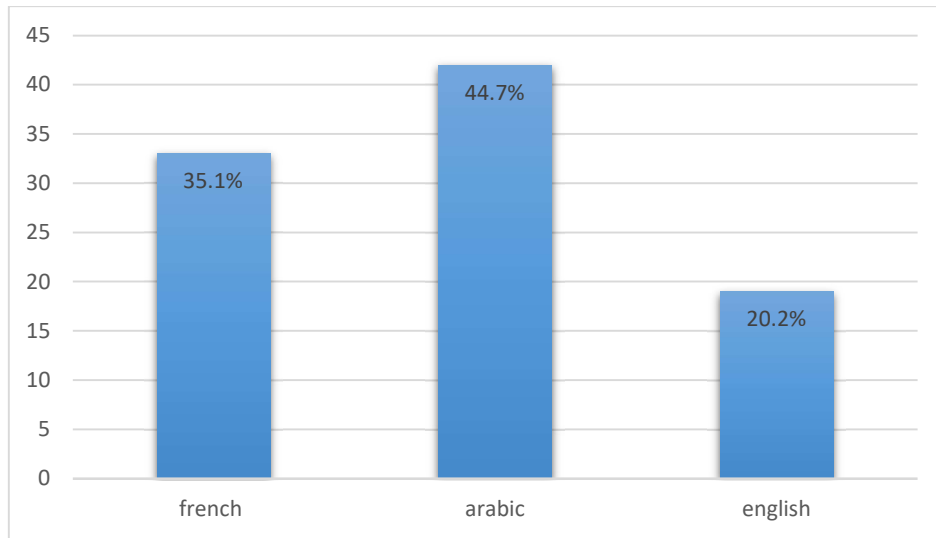
participation, while 25.9% sometimes utilised English in class. On the other hand, only a small minority of 3.4% often used English, and an equal percentage (3.4%) always participated in English during class.



**Figure 2.15. Frequency of English Use in Classroom Participation.**

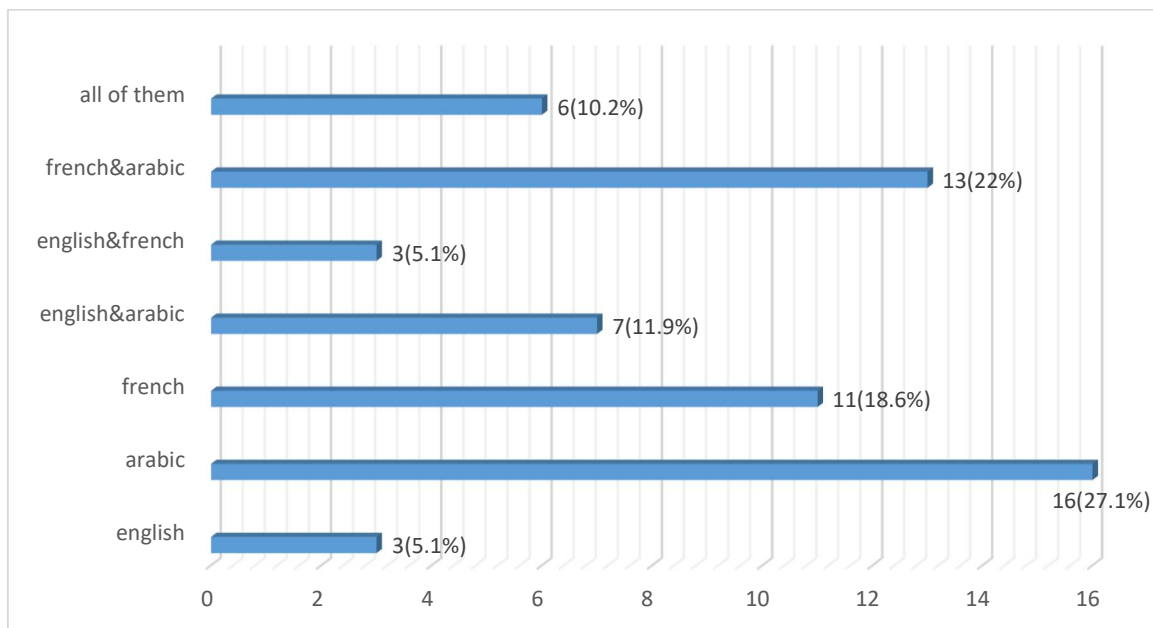
### **Question 14: Preferred Languages for Classroom Participation**

This question is a multiple-choice question that allows multiple selections, which means the number of choices (94) is larger than the students (59). Therefore, Figure 2.16 demonstrates the frequency with which students chose whether on its own or in combination with another language. Notably, Arabic was the most favourite language to participate in, representing 44.7% of all responses. Furthermore, French came in the second place at 35.1% as the preferred language to participate in the classroom. Finally, 20.2% included English as the preferred language of participation.



**Figure 2.16. The Preferred Language for Classroom Participation**

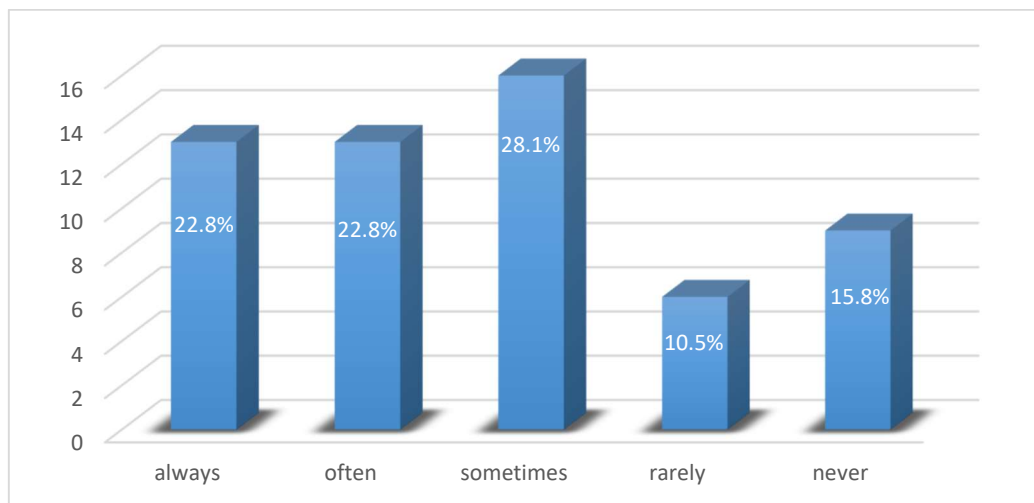
According to participants' responses, a notable 27.1% selected Arabic as their preferred language for classroom participation, followed by French at 18.6% as the preferred medium of participation, while only 5.1% chose English. Moreover, 10.2% expressed that a combination of all three languages would be suitable for participating. Furthermore, 22% reported that the combination of French and Arabic is their preferred medium of participation. In addition, 11.9% favoured using English and Arabic, and finally, 5.1% opted for participation in English and French, as demonstrated in Figure 2.17.



**Figure 2.17. The Preferred Languages for Classroom Participation.**

### Question 15: Frequency of Participation Avoidance Due to English Proficiency.

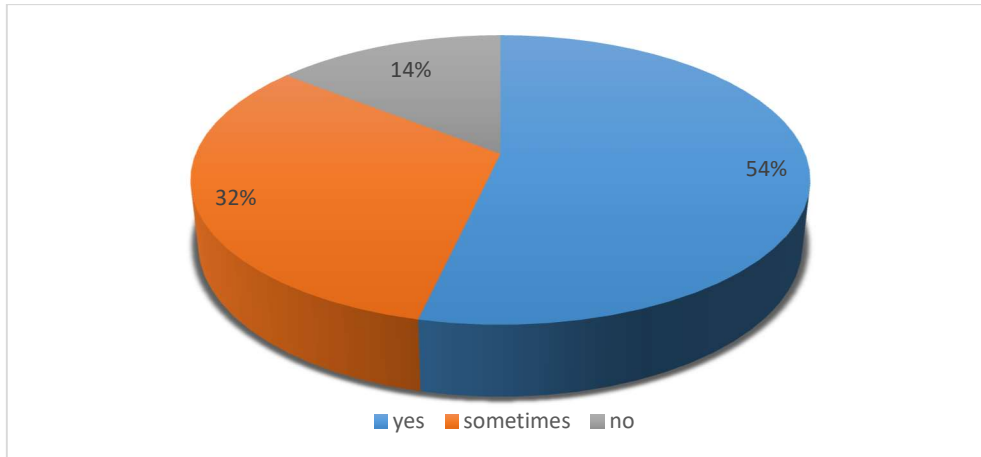
Two students did not provide an answer to this question. As shown in Figure 2.18, 22.8% of respondents expressed that they always avoided participating in the class due to their English skills. Therefore, a similar percentage, 22.8%, said that they often avoided participating in English due to their skills, while 28.1% said that they sometimes avoided participating in English for the same reason. On the other hand, 10.5% reported that they rarely avoided participating in English, and 15.8% reported that they never avoided participating in English because of their skills.



**Figure 2.18. Frequency of Participation Avoidance Due to English Proficiency.**

### Question 16: Students' Difficulties in Asking Questions in English

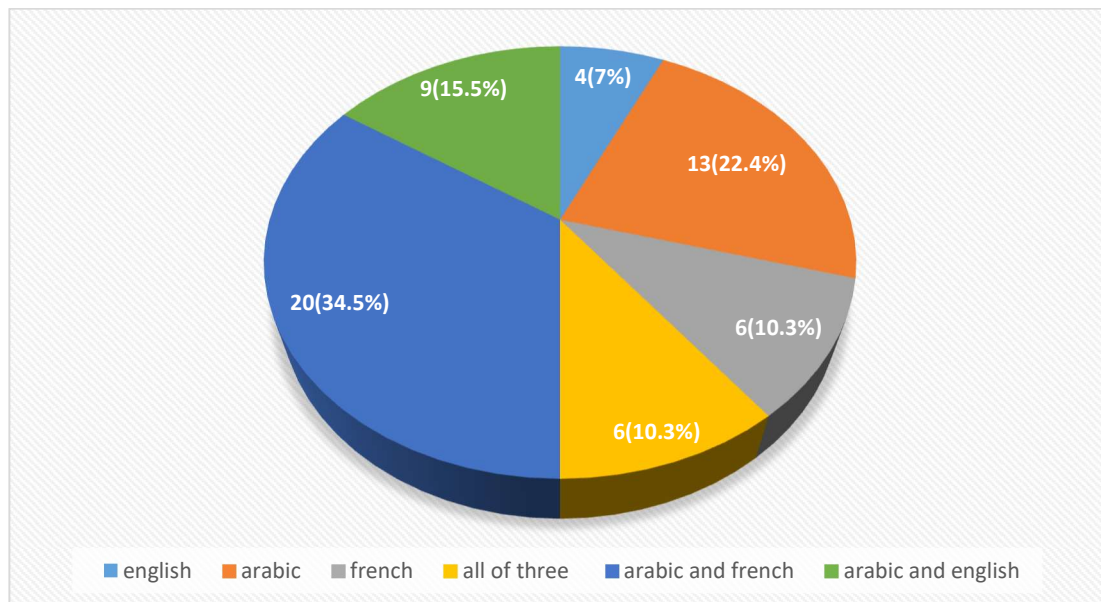
Three students did not participate in this question. According to the findings, a considerable majority, 54%, reported facing difficulties when asking questions in English. Additionally, 32% of the students expressed that they sometimes struggle asking questions in English, while only 14% had no problems asking questions in English.



**Figure 2.19. Students’ Difficulties in Asking Questions in English**

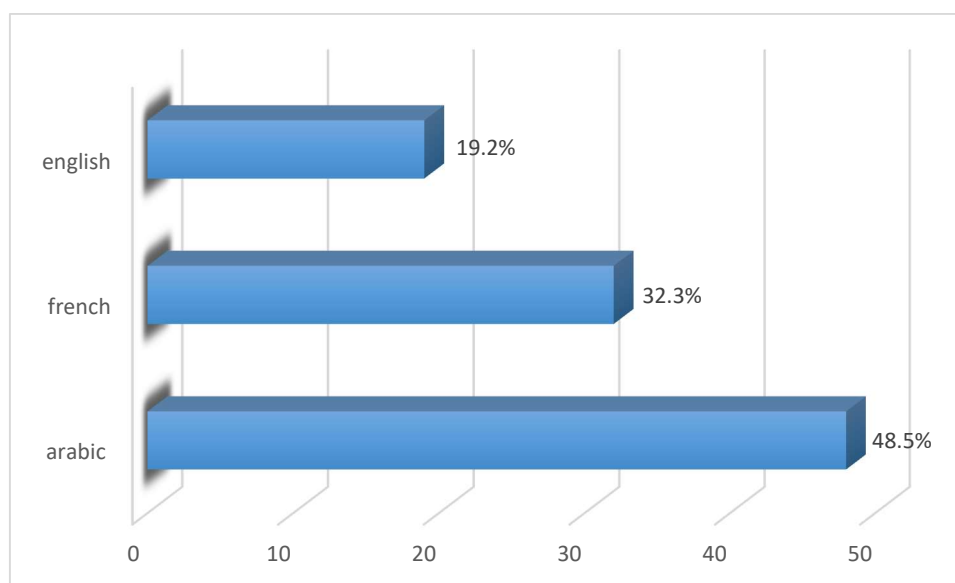
**Question 17: The Languages Used by Students to Write Their Notes.**

Out of the 59 surveyed students, one student did not provide an answer to this question. According to Figure 2.20, a small number reported using a single language, with 7% taking notes only in English, 10.3% in French, and 22.4% in Arabic. In comparison, a larger group preferred mixing two languages, with 34.5% combining French and Arabic, and 15.5% combining English and Arabic. However, no student reported using a combination of English and French. Therefore, 10.3% favoured using all three languages when taking notes.



**Figure 2.20. The Languages Used by Students to Write Their Notes**

For this question, it is important to note that many respondents reported using more than one language when taking notes, resulting in 99 choices, as illustrated in Figure 2.20. Therefore, Figure 2.21 shows that Arabic was the most frequently used language overall, either on its own or in combination with others, involved in 48 of the responses, which represented approximately 48.5% of the total. Followed by French with 32 mentions (32.3%), whereas English was the least used language to write notes, with 19.2% responses as a single language or a combination.



**Figure 2.21. The Preferred Language for Students to Write Their Notes**

### **Question 18: The Effects of the English Language in Exams.**

One student did not answer the question. The analysis revealed that 35 students (60%) reported that the use of English in the exams affected their grades, while 23 students (40%) reported the reverse. Moreover, when asked to specify the reason behind this effect, 25 students illustrated that their problem was a misunderstanding of questions in English, and two others explained that they used incorrect terms in their answers, which led to losing points. Additionally, the remaining 6 students reported experiencing both misunderstanding and terminology issues. It should be noted that three students did not answer this question. The results are described in Figure 2.22.

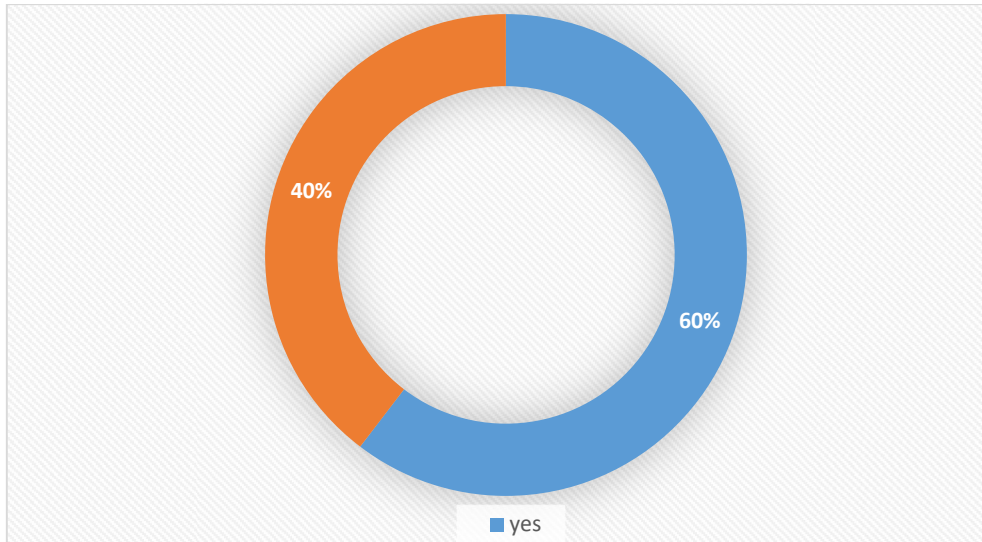


Figure 2.22. The Effects of the English Language in Exams.

**Question 19: The Positive and Negative Impact of English on Mathematics Students' Scientific and Knowledge Development.**

Out of the 59 surveyed students, 18 students did not answer this question, leaving a total of 41 participants. The answers were divided into three parts: positive, negative, and neutral impact. Moreover, the answers are illustrated in the tables below:

**Table 2.3. The Positive Impact of English on Mathematics Students' Scientific and Knowledge Development.**

Impact	Answers	Frequency	Percentage
positive	Positive	3	56.1%
	It facilitates understanding of different lectures from universities around the world	1	
	It enhances lesson comprehension	3	
	It opens up valuable opportunities for future jobs	1	
	It is like having an extra weapon	1	
	It is crucial for accessing global knowledge	4	
	It is beneficial for those pursuing PhD studies	1	
	It aids in the development of language skills and the necessary vocabulary	2	
	It enables a deeper understanding of the speciality	1	
	It enriches scientific knowledge	6	

According to Table 2.3, 56.1% of the students who responded to the question recognised the positive impact of English on their scientific and knowledge development. Specifically, 6 students expressed that English enriches their scientific knowledge, while 4 students emphasised that the language was crucial for accessing global knowledge. However, three students were content with a single word, which is “positive”. Furthermore, three other students reported that it enhances lesson comprehension, and two mentioned that using English as a medium of instruction helps develop their language skills. One student even described English as an “extra weapon”. Moreover, one said that it enables a deeper understanding of the speciality, and another specified that it helps him/her understand different lectures from universities around the world. Additionally, one student expressed that English is beneficial only for those pursuing a doctoral degree. Lastly, one student concluded that proficiency in English opens up valuable opportunities for future employment.

36.6% believed that English harmed their scientific and knowledge development. According to them, this is due to a lack of understanding of the language, which leads to significant challenges. Students reported that they encounter difficulties in asking questions, grasping the teacher's instructions, and comprehending mathematical concepts, which ultimately affects their performance in exams. Finally, 7.3% chose a neutral stance, explaining that they would love to implement English, and they know how important the language is; however, they are not competent.

### **Question 20: Students' Suggestions on Improving and Simplifying the Use of English as a Medium of Instruction**

Out of the 59 surveyed students, only 24 (40.7%) answered this question. However, each one of them provided valuable insights, which are explained in the following table:

**Table 2.4. Students' Suggestions on Improving and Simplifying the Use of English as a Medium of Instruction**

Suggestions	Frequency	Percentage
Use only English in the classroom, but support it with translation into Arabic.	4	16.70%
Provide free English training for students	5	20.80%
Adding English classes to improve students' proficiency	10	41.70%
Generalising instructions in English	2	8.30%
learn the language at home	1	4.20%
Do not implement English	2	8.30%

According to the findings, 10 (41.7%) students suggested that the administration introduce additional English classes. Additionally, 5 (20.8%) recommended providing free training opportunities. Furthermore, 6 students proposed generalising instruction in English, with four of them emphasising the importance of adding Arabic translation to enhance students' understanding. One student suggested that each student should learn the language by themselves. However, two students opposed the implementation of English as an instructional language.

### 2.7. The Interpretation and the Discussion of the Data:

After analysing the collected data from classroom observation, students' questionnaire, and teachers' interviews, several key findings emerged. The gathered data showed that both teachers and students are aware of the crucial role of English in academic studies. However, they did express their struggles when it comes to using EMI. The students' questionnaire indicated that they struggled with their low English proficiency, which often led them to avoid participating or asking questions in English out of a lack of confidence. Instead, they preferred participating in Arabic and French. Additionally, students encountered difficulties comprehending the lessons and would prefer using the Arabic language instead, as they were more comfortable with it. This language transition also affected their exam performance since they misunderstood the questions.

From teachers' interviews, teachers noted that students already have prior knowledge of Arabic and French. This rapid transition made the students struggle to

understand the context and express themselves effectively in English, whether in speaking or writing. The classroom observation further corroborated these findings, revealing that students rarely participated or asked questions in English, and their understanding of English is limited to some repeated words. This situation aligns with the observation of Ouarniki (2023) and Khenioui and Boulkroun's (2023), who have similarly highlighted mostly the same challenges faced by students, such as low English proficiency that hinders understanding and engagement in the classroom. Accordingly, our first hypothesis, which stated that students with low English proficiency and limited exposure to the language face difficulties in understanding and participating, is confirmed with our findings. Additionally, the findings also reveal one additional challenge: the struggle with writing skills, which has an impact on their exam grades.

The second hypothesis stipulated that first-year mathematics teachers struggle with their low English proficiency, which affects their lesson delivery and reveals the insufficiency of the teacher training. The collected data yielded insightful results. Classroom observation indicated that teachers struggled with vocabulary, frequently finding it challenging to recall the right word at the right moment, which led them to rely on French since they already had a previous repertoire in the language. Teachers believed that they struggled with their speaking skills, which was compounded by their students' low English level.

The constant translanguaging is tiring and time-consuming, and it adds more work for the teachers since they have to create two versions of lessons and exams, one in English and another in French. This situation led one teacher to revert to using French as their primary medium of instruction. Moreover, the intensive training they received was not that helpful; it only focused on general English and grammar, leaving teachers uncomfortable using the language in a specialised context. These findings align with the previous study of Ouarniki (2023) that explained teachers' struggles with low English level and inadequate teacher training. These results obtained from all the research instruments support one another and affirm our second

hypothesis. The results also added to the hypothesis one point, which is that teachers struggled with the constant translanguaging.

The last hypothesis demonstrated that incorporating translanguaging practices, along with practical teacher training and a tailored English course for students, will significantly enhance students' understanding and engagement in an EMI classroom. The classroom observation indicated that students had a better grasp of concepts when the teacher translated into Arabic or French, aligning with the research of Lu et al. (2023). The students suggested generalising the instruction in English while supporting it with translation into Arabic. Thus, they also advocate for English training or a customised ESP course to their needs. Although the findings of the questionnaire showed that the current ESP course was effective, others opposed it, stating that there is no English course. This contradiction likely stems from the nature of online courses, which may consist of only a few documents sent to students, or from the limited frequency of classes, which occurs just once a week for one semester (See 2.2).

Teachers also echo with students' ideas, affirming that they assist their students with translation. They advocated the enforcement of the implementation and emphasised the necessity of providing all teachers with appropriate training in both general and technical English. Additionally, they recommend a gradual approach that includes training for students before entering the university. Overall, the findings of this study correlated with those of Ouarniki (2023) and Khenioui and Boulkroun's (2023), validating our hypothesis. Moreover, the findings incorporated other suggestions, such as enforcing the implementation and a gradual rollout.

### **2.8. Recommendations**

In light of the challenges identified, several recommendations can be made to improve the EMI situation for both teachers and students.

#### **2.8.1 Recommendations for the Ministry of Higher Education**

The Ministry is advised to consider some concerns and not rush to implement an important policy like EMI to ensure its success and avoid potential pitfalls (See

1.2.3). First, there must be an alignment between the ministry guidelines (See Appendix A) and the actions of teachers and departments. For the policy to be successful, its implementation must be taken seriously and examined from all perspectives. Secondly, there must be language training for teachers that is tailored to their needs. Teachers do not need to learn English from scratch; they require tailored training explicitly designed for them by language and subject matter experts. In addition to teachers' training, students also need some language support. The researcher suggests a combination of the preparatory year model and the concurrent model (see 1.3.5). The preparatory year model will build both their general and specialised English skills, and it does not have to extend for a whole year; it could be for six months, three months, or even one month if the best minds collaborate to make it succeed. Therefore, the concurrent support model will further enhance student understanding of technical English and address language challenges as they arise later.

Moreover, the Ministry can also help teachers with training on how to use translinguaging effectively, which will enhance students' understanding. This could be achieved by suggesting a unified model of pedagogy based on thorough research, rather than allowing every educator to teach randomly. The researcher recommended the English-Dominant, Interactive model as it aligns with the previous suggestions (See 1.3.2.1). This model will actively engage students, including those with limited English proficiency, and significantly aid in developing their language skills.

### **2.8.2. Recommendation for the Department of Mathematics**

The Department of Mathematics ought to implement the plan in line with the ministry's intentions. Additionally, it should offer its students an ESP or EAP course. Therefore, the researcher, with the help of a teacher of Mathematics, suggested a unit for an ESP English course adapted from Bouklikha's (2016) doctoral thesis, modifying it to suit the mathematical technical terms. Since students reported struggling with understanding questions in their exams, the researcher chose reading as the focus of this unit due to its importance. This unit's objectives are to understand and explain key mathematical terms that relate to sets and real numbers. This

foundational knowledge allows individuals to engage with mathematical concepts more effectively. Additionally, it also aims at extracting and summarising the main ideas from mathematical texts, which enables learners to grasp complex ideas and communicate them.

Moreover, the unit is an introduction to sets and real numbers, structured into three parts: pre-reading, while-reading, and post-reading. In the pre-reading phase, the teacher will engage students by presenting a relevant image, such as a photo of sets, to refresh students' memory and connect with their prior knowledge from high school. Moreover, the while-reading part is designed to raise comprehension through various sub-reading skills like skimming and scanning. It includes various activities such as multiple-choice, comprehension questions, true-false statements, matching pairs, etc. Finally, the post-reading part raises the difficulty with more challenging exercises aimed at enhancing understanding and mastery of the text. Activities in this part include summarising the text, filling the gaps, previewing and note-taking tasks. This structured approach guarantees a thorough and engaging learning experience (See Appendix J)

### **2.9. Conclusion**

This chapter outlined the research methodology employed to address the research objectives. It began by outlining the research design and justifying its suitability for the study. The researcher opted for an exploratory investigation and applied the case study research design, utilising classroom observation, interviews, and questionnaires as instruments to gather data. The gathered data were analysed both qualitatively and quantitatively, ensuring a comprehensive understanding of the findings. The researcher then interpreted the data and discussed whether the findings support or contradict the hypotheses. Furthermore, the researcher addressed some recommendations for improving the adoption of EMI.

# General Conclusion

English has become an essential requirement, often viewed as the key to navigating today's world. This language is necessary for global communication, scientific advancement, job opportunities, and engagement on social media, among other purposes. Many countries started recognising the importance of this language and ensuring that their youth do not miss out on the opportunities it presents. Algeria is not an exception, and it is significantly influenced by globalisation and the rise of English as a lingua franca. In response to global challenges, the nation has taken significant steps to prepare its young population for an English-dominated world. As a result, teaching English became a necessity for the majority of students in Algeria. In 2023, the Ministry of Higher Education adopted the use of EMI in scientific fields. This move reflects a commitment to enhancing education and equipping students for a rapidly evolving global landscape. This policy is a remarkable step towards a brighter future for education in Algeria, guaranteeing that the country keeps pace with a fast-changing world. However, despite its significance, this significant progression encountered several obstacles and faced various challenges.

This present study explores the adoption of EMI within the Department of Mathematics at the University of Tlemcen. It specifically addresses three research questions that explore the challenges faced by both students and teachers, and the proposed solutions to face those challenges. To answer these research questions, the researcher suggested three hypotheses. The first one indicated that students' low exposure and English proficiency are affecting their learning of the content and engagement. The second hypothesis highlights that the teachers' low English level and the insufficient language training are obstacles to presenting the lessons effectively and communicating with the students. Lastly, the third hypothesis suggests that using translanguaging, providing adequate training for teachers, and appropriate language support for students will help overcome the identified obstacles.

Therefore, this research is divided into two comprehensive chapters. The first chapter provides a review of the literature about EMI, highlighting the linguistic historical context necessary for a robust introduction of EMI. It then defines EMI, explores its types, discusses its benefits and challenges, highlights some language support models, translanguaging, and ESP adoption. Additionally, it also

contextualises EMI within Algeria and provides some previous studies that reinforce the hypotheses presented. The second chapter outlines the methodological framework of the study. Therefore, it employs both quantitative and qualitative analyses of the collected data, ensuring a well-rounded discussion that seeks to find solutions and generate recommendations for creating a better EMI experience.

After conducting four classroom observations, five interviews with different teachers, and collecting responses from 59 student questionnaires, the three hypotheses were confirmed, and additional insights were uncovered. The findings indicated that both teachers and students are challenged by their low English level, which impacts communication and comprehension. More precisely, teachers struggled with their speaking skills, vocabulary, and the constant need for translanguaging was tiring. Whereas students find the rapid transition combined with their low English proficiency challenging, which affects their understanding, speaking and writing skills, and ultimately their engagement and exam performance, confirming the first and second hypotheses. Furthermore, teachers and students proposed some solutions to address these challenges. Teachers explained their use of translation in students' mother tongue to support their low English proficiency. Additionally, both groups emphasised the importance of proper tailored training and encouraged enforcing the implementation, but gradually, aligning with the third hypothesis.

The findings of this study revealed that the use of EMI in higher education, particularly in the Department of Mathematics, presents several challenges that require practical solutions. The research not only approved all the initial difficulties and proposed solutions but also uncovered new aspects and perspectives. Indeed, considering this study's findings and those of previous studies, this adoption is primarily a top-down policy implemented without adequate consultation with the main stakeholders. This approach has led to a range of implementation challenges, including but not limited to the linguistic and pedagogical challenges for both students and content teachers.

Conducting this study encountered several obstacles that limited its progress. Therefore, it aimed at including all first-year students as a sample; however, only 59 students cooperated. Also, the researcher was initially tempted to have only an online format of the students' questionnaire. However, the low response rates from the online versions led the researcher to rely on a printed version, which was distributed in class. Additionally, the sample exhibited a gender gap, with a higher proportion of female participants than male participants. This could mean that the experiences and viewpoints collected might favour a more female perspective. Moreover, many students didn't provide an answer to the open-ended questions, making it difficult to generalise the study's findings. Another obstacle the researcher faced was the struggle to access the new articles since most of them were not accessible without payment.

Research on this topic in Algeria is novel, so the field of research focus is vague. However, the researcher proposes investigating the language use of teachers and students in an EMI classroom, and its effect on the teaching and learning processes. Other researchers could consider studying students at various levels and even comparing them, rather than focusing only on first-year students. Further study could examine the models of pedagogy used by different teachers and attempt to identify the most successful one. It could also be valuable to analyse the intensive training provided by the Ministry for teachers, assessing its advantages and disadvantages, and perhaps even suggesting an alternative approach.

The implementation of EMI in higher education has the potential to significantly enhance students' readiness for a globalised environment and increase their chances of success in higher education and the job market. Adopting this policy will equip Algerian students with the necessary skills to thrive in the globalised world. However, it is essential for the Ministry of Higher Education to ensure that language does not become a barrier to learning, especially in Algeria's complex linguistic environment, but rather a bridge to opportunity. To achieve this, a strategic and gradual adoption of EMI, accompanied by necessary reforms, is essential. This approach should take into account the unique linguistic context of Algeria and focus on providing tailored language training that equips individuals with the necessary skills and knowledge during this transition. These elements will play a crucial role in

determining whether EMI becomes a successful and meaningful part of the higher education system.

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# Appendices

## APPENDIX A: Ministerial Decrees



الجمهورية الجزائرية الديمقراطية الشعبية  
وزارة التعليم العالي والبحث العلمي  
People's Democratic Republic of Algeria  
Ministry of Higher Education and Scientific Research



الجزائر، 6 نوفمبر 2022

الديوان  
خلية الاعلام والاتصال

## مؤشرات وإجراءات عملية لتكوين الأساتذة الباحثين في اللغة الإنجليزية

في إطار تعزيز مكانة اللغة الإنجليزية في التعليم والتكوين بمؤسسات التعليم العالي، ومتابعة لتقييم مسعى تكوين الأساتذة في اللغة الإنجليزية، وجهت مراسلة في هذا الصدد إلى رؤساء الندوات الجهوية للجامعات، بالإتصال بالسيدات والسادة مديري مؤسسات التعليم العالي، تتضمن أهم التوجيهات والمؤشرات التي حددها السيد الوزير، بخصوص عدد الأساتذة المستهدف تكوينهم، من طرف مؤسسات التعليم العالي، مع نهاية الموسم الجامعي الحالي 2023/2022:

1. بالنسبة للعلوم والتكنولوجيا تكوين 80 بالمائة على الأقل منهم.
2. بالنسبة للأساتذة في ميدان العلوم الاجتماعية والإنسانية وميدان العلوم الطبية، تكوين 100 بالمائة من الأساتذة الذين يدرسون الوحدات الأفقية.
3. أما بالنسبة للمؤسسات الجامعية التي تتوفر على مراكز للتعليم المكثف للغات، أو أقسام تكوين في اللغة الإنجليزية، فعليها التكفل باستغلالها في تكوين أساتذتها.
4. بالنسبة للمؤسسات الأخرى سيوضع تحت تصرفها منصة رقمية من طرف اللجنة الوطنية المكلفة بالتعليم عن بعد ، بدءا من 1 ديسمبر 2022 ، مخصصة لتكوين الأساتذة في اللغة الإنجليزية.
5. بالنسبة للمؤسسات الجامعية التي تتوفر على مكونين متحكمين في اللغة الإنجليزية، فيتعين عليها الشروع في تدريس المواد التي يشرف عليها هؤلاء الأساتذة باللغة الإنجليزية، بدءا من السنة الجامعية الجارية.

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البريد الإلكتروني:

الموقع الإلكتروني:

للتواصل معنا:

الفاكس:

023238043

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## الجمهورية الجزائرية الديمقراطية الشعبية

وزارة التعليم العالي والبحث العلمي

المديرية العامة للتعليم والتكوين

الجزائر في 18 ماي 2023

رقم: 301 / م.ع.ت.ع / 2023

السادة رؤساء الندوات الجهوية للجامعات  
بالاتصال مع السيدات والمندوبين مدراء مؤسسات التعليم العالي

الموضوع: حول ترقية التدريس باللغة الانجليزية.

- بغية ترقية التدريس باللغة الانجليزية كلغة للعلم والتكنولوجيا ، أطلب منكم ما يلي:
- برمجة مواد التعليم في الجذع المشترك بالانجليزية وإسنادها لأساتذة حاصلين على الأقل على مستوى (B2) في اللغة الانجليزية.
  - مواصلة تكوين الأساتذة باللغة الانجليزية لبلوغ مستوى (B2).
  - وضع مخطط استراتيجي لتطوير التدريس باللغة الانجليزية في مؤسساتكم.
- كما أطلب منكم القيام بتمذجة لاستعمال الزمن ابتداء من اليوم وذلك لتفادي كل النتائج الناجمة عن نقص في التأطير والتواصل مع الأساتذة المكونين في الجذع المشتركة اللذين تمت برمجتهم من أجل المعالجة المسبقة لأية نقائص محتملة وكذا معرفة وتقييم مدى استعدادهم لهذه العملية.
- كما أحيطكم علما أنه سيتم متابعة وتقييم هذه العملية على مستوى كافة المؤسسات الجامعية عقب الشروع فيها.

أولى أهمية باللغة لتنفيذ فحوى هذه المذكرة.

تفضلوا، بقبول فائق عبارات التقدير والاحترام.

Signature numérique de Ali

CHOUKRI

Date : 2023.05.18 14:31:58 +02'00'

## الجمهورية الجزائرية الديمقراطية الشعبية

وزارة التعليم العالي والبحث العلمي

المديرية العامة للتعليم والتكوين

بالجزائر، في 26 مارس 2025

رقم : 49/م.ع.ت.ت/ 2025

إلى السادة رؤساء الندوات الجهوية للجامعات  
بالإتصال مع مديري مؤسسات التعليم العالي

**الموضوع:** ب/خ التدريس باللغة الإنجليزية

**المرجع :** المراسلة رقم 106 المؤرخة في 07 أبريل 2024

تحسبا للدخول الجامعي 2025-2026 ومواصلة للعمل بالمنكرة رقم 106 المؤرخة في 07 أبريل 2024 المتعلقة بتدعيم التدريس باللغة الإنجليزية، يشرفني أن أطلب منكم الإستمرار في تكوين الأساتذة للتدريس باللغة الإنجليزية، حسب البرنامج المسطر من طرف كل مؤسسة جامعية، مع موافقتنا بما تم اتخاذه في هذا الشأن على أقصى تقدير يوم الخميس 17 أبريل 2025.

تقبلوا مني خالص عبارات التقدير والإحترام.

Digitally signed by Ali CHOUKRI  
Date: 2025.03.26 10:31:41 +01'00'

## Appendix B: L1 English Lesson

### Greek Letters and Their Modern Uses

Today, Greek letters serve various purposes across multiple fields in mathematics and science. Here are some of the most widely used Greek letters and their applications:

- Pi ( $\pi$ ): Perhaps the most famous Greek letter in mathematics,  $\pi$  represents the ratio of a circle's circumference to its diameter, approximately equal to 3.14159. Its use as a symbol for this constant dates back to the 18th century, when Welsh mathematician William Jones first used it in 1706, and it was later popularized by Euler.
- Delta ( $\Delta$ ): The uppercase Delta,  $\Delta$ , is commonly used to denote change or difference in calculus and physics, such as in expressions like  $\Delta x$ , meaning the change in  $x$ . The lowercase delta,  $\delta$ , is often used to represent very small values or limits.

#### Anglais Scientifique

### 1 Exercices de traduction - mathématique

Traduire en anglais les phrases suivantes et comparer avec la traduction fournie.

#### 1. Equations

- Il nous faut maintenant résoudre en  $x$  l'équation (3).**  
We must now solve equation solve equation (3) for  $x$ .
- C'est parce que l'équation de Liouville est auto-adjointe que l'on peut obtenir une solution aussi simple.**  
The reason we obtain so simple a solution is because the Liouville equation is self-adjoint.
- En coordonnées elliptiques, les variables se séparent dans l'équation de Helmholtz  $\Delta f + k^2 f = 0$ .**  
The Helmholtz equation  $\Delta f + k^2 f = 0$  is separable in the elliptic coordinate system.
- C'est seulement pour certaines valeurs de l'entier  $n$  que la fonction  $f_n(x)$  satisfera les conditions aux limites.**  
Only for certain values of the integer  $n$  will the function  $f_n(x)$  satisfy the boundary conditions.
- La fonction de Green du problème de Sturm-Liouville peut s'obtenir par développement en série par rapport aux fonctions propres  $f_n(x)$ .**  
The Green's function for the Sturm-Liouville problem may be expressed in an infinite series in the eigen functions  $f_n(x)$ .
- Il est intéressant de pouvoir vérifier directement que la solution satisfait les conditions aux limites.**  
It is of interest to check directly that the solution satisfies the boundary conditions.

#### 2. Definitions

- $\delta(x)$ , appelé «fonction» delta, est en fait une distribution définie telle que ...**  
The so-called delta "function",  $\delta(x)$ , is in fact a distribution defined such that ...
- Dyson a montré qu'il existe un opérateur  $\Sigma$ , appelé opérateur de masse, tel que ...**  
Dyson showed that there exists an operator  $\Sigma$ , called the self-energy operator, which has the property that ...
- On dira que le processus  $X(t)$  est fortement stationnaire si...**  
The process  $X(t)$  is called strongly stationary if ...
- Le spectre du processus  $X(t)$  sera l'ensemble des nombres réels  $x$  tels que ...**  
The spectrum of  $X(t)$  is the set of all real numbers  $x$  with the property that ...

## Appendix C: Permission to Pursue the Study

تلمسان يوم 4 فبراير 2025

الطالبة بن زوبع أسماء  
السنة الثانية ماستر  
جامعة أويكر بلقايد تلمسان  
كلية الأدب واللغات  
قسم لغة انجليزية  
البريد الإلكتروني : [esmaabenz@gmail.com](mailto:esmaabenz@gmail.com)

إلى السيد بن طيفور رشيد رئيس قسم الرياضيات  
كلية العلوم  
جامعة أويكر بلقايد تلمسان

الموضوع : الترخيص للقيام بدراسة ميدانية  
السيد رئيس قسم ،

يشرفني ان اطلب من سيادتكم قبول طلبي هذا والمتمثل في القيام بدراسة ميدانية على مستوى قسم الرياضيات السنة الأولى ليسانس ، بهدف تلمين دراستي حول موضوع التدريس باللغة الانجليزية كلية وسيطة في مذكرة الماستر بعنوان :

**Investigation the Implementation of English as a Medium of Instruction in the Department of Mathematics: Case of First-Year Students**

سيدي أعلمكم ان بحثي هذا يهدف إلى تطوير عملية الانتقال إلى التدريس باللغة الانجليزية، وذلك بالتركيز على التحديات التي يواجهها الأساتذة والطلبة ، والبحث عن حلول لتعزيز التعلم بشكل أكثر فعالية وشمولية . كما أن وجودي في القسم يتضمن حضور دروس ؛ الملاحظة والقيام بمقابلات مع الأساتذة والطلبة على حد سواء

وفي الأخير وانتظارا لرد إيجابي تقبلوا مني فائق التقدير والاحترام

المعني بالأمر

الاستاذة المشرفة : غوالي كميلا

  
**GHOUALI Kamila**  
Maître de Conférences B  
Université de Tlemcen

  
بن طيفور رشيد  
رئيس قسم الرياضيات



## Appendix D: Observation Grid

<b>Date:</b>		<b>The level:</b>		<b>The duration:</b>	
<b>The observer:</b>			<b>The observed:</b>		
<b>Teachers' performance</b>					
<b>category</b>	<b>Observation Criteria</b>			<b>Notes/Comments</b>	
- Medium of Instruction	The teacher uses English as the primary medium of instruction.				
	Teacher's level of English proficiency (e.g., fluent, basic, advanced).				
	The teacher switches to another language (e.g., for explanation, discipline).				
Teaching practices	Teacher uses strategies to encourage learners to use English (e.g., asking open-ended questions, modelling responses)				
	The teaching methods (e.g., lecture, group work, problem-solving) used				
	visual aids (e.g., slides, diagrams) used to support EMI				
	Teachers provide feedback in English. How frequent and effective is it?				
Course materials	Availability of adequate EMI resources (e.g., textbooks, supplementary materials)				
<b>Learners' behaviour</b>					
- learners' medium of participation	Learners use English to participate in classroom discussions.				
	Learners show confidence or hesitation in using English.				
	Learners switch to another language during participation.				
	learners collaborate in English during group tasks or activities.				
Learners' comprehension	Learners are able to follow the lecture content in English.				
	Learners write their notes in English				

## Appendix E: Teachers' Interview

Last year saw a significant change in higher education. This change is the shift of the language used for instruction from French to English in scientific disciplines. This transition introduced a range of new aspects and challenges for educators delivering scientific content.

This interview investigates the use of EMI in math, focusing on challenges faced by teachers and learners. It aims to identify areas for improvement and support for more effective and inclusive learning.

If you agree, this interview will be recorded, transcribed, anonymised, and aggregated. The results will be prepared as a study in the English department. Upon completion of the study, recordings will be deleted from all devices.

I assure you that anonymity will be maintained and no inferences about your identity will be possible

### **First part:**

**Question 1:** Could you share some background details about yourself, including :

- Age
- Gender
- Rank (MAB/MCB/MCA/Prof.)
- Number of years in teaching
- Modules you're currently teaching

### **Second part:**

**Question 2:** Did you receive any training on the application of EMI? If so, could you please elaborate on the nature of that training?

**Question 3:** What is your perspective on the transition from using French to English as the medium of instruction in higher education?

**Question 4:** how often do you use English as a medium of instruction in your classroom? What is your level of comfort in teaching in English?

**Question 5:** What challenges do you face when using EMI ?

**Question 6:** In which areas do your students experience the greatest difficulties? What strategies do you use when encountering these circumstances?

**Question 7:** In your opinion, what benefits does the implementation of English bring to the field of mathematics?

**Question 8:** What do you think could be done to make it easier for both teachers and students to use English effectively in the classroom?

## مقابلة مع الاساتذة

شهد العام الماضي تغييرا كبيرا في التعليم العالي. وهذا التغيير هو تحول اللغة المستخدمة في التدريس من الفرنسية إلى الإنجليزية في التخصصات العلمية. قدم هذا التحول مجموعة من الجوانب والتحديات الجديدة للأساتذة الذين يقدمون المحتوى العلمي.

تبحث هذه المقابلة في استخدام اللغة الانجليزية كلغة وسيطة في الرياضيات، مع التركيز على التحديات التي يواجهها الأساتذة والطلبة. ويهدف إلى تحديد مجالات التحسين والدعم من أجل تعلم أكثر فعالية وشمولاً.

إذا وافقت، فسيتم تسجيل هذه المقابلة ونسخها وإخفاء هويتها وتجميعها. سيتم إعداد النتائج كدراسة في قسم اللغة الإنجليزية. عند الانتهاء من الدراسة سيتم حذف التسجيلات من جميع الأجهزة.

أؤكد لك أنه سيتم الحفاظ على سرية هويتك ولن يكون من الممكن التوصل إلى أي استنتاجات حول هويتك

السؤال 1: هل يمكنك مشاركة بعض التفاصيل الأساسية عن نفسك بما في ذلك:

- - العمر
- - الجنس
- - الرتبة

- عدد سنوات التدريس

- الوحدة التي تقوم بتدريسها حالياً

السؤال 2: هل تلقيت أي تدريب على تطبيق؟ إذا كان الأمر كذلك، هل يمكنك توضيح طبيعة هذا التدريب؟

السؤال 3: ما هي وجهة نظرك بشأن الانتقال من استخدام الفرنسية إلى الإنجليزية كوسيلة للتعليم في التعليم العالي؟

السؤال 4: كم مرة تستخدم اللغة الإنجليزية كوسيلة للتعليم في الفصل الدراسي الخاص بك؟؟ ما هو مستوى راحتك في التدريس باللغة الإنجليزية؟

السؤال الخامس: ما هي التحديات التي تواجهك

السؤال 6: في أي المجالات يواجه طلابك أكبر الصعوبات؟ ما هي الاستراتيجيات التي تستخدمها عند مواجهة هذه الظروف؟

السؤال 7: في رأيك، ما هي الفوائد التي يجلبها تطبيق اللغة الإنجليزية إلى مجال الرياضيات؟

السؤال 8: ما الذي تعتقد أنه يمكن فعله لتسهيل استخدام الأساتذة والطلاب للغة الإنجليزية بشكل فعال في الفصل الدراسي؟

## Appendix F: Students' Questionnaire

This questionnaire aims to collect data about implementing English as a medium of instruction in the Department of Mathematics. You are kindly invited to answer the following questions. Your responses will remain confidential.

- I give my consent to participate in this questionnaire.

1. What is your gender?

- Male
- Female

2. What is your age range?

- 17 to 20
- 21 to 30
- Above 30

3 What is your English level?

- Low
- Average
- Good
- Excellent

4 Do you have any training experience in English?

- Yes
- No

If yes, can you elaborate more on what kind of training and what it focuses on: ( you can choose more than one answer)

- |                                 |                                    |
|---------------------------------|------------------------------------|
| <input type="radio"/> Reading   | <input type="radio"/> Grammar      |
| <input type="radio"/> Writing   | <input type="radio"/> Speaking     |
| <input type="radio"/> Listening | <input type="radio"/> others:..... |

5 How often does your teacher use English in class?

- Always

- Often
- Sometimes
- Rarely
- Never

6 What other languages does your teacher use?

- Arabic
- French
- both

7 When your teacher switches to another language, do you find it helpful?

- Yes, it helps me understand better.
- Sometimes, but I prefer English.
- No, it doesn't help.

8 Which language do you feel most comfortable with when your teacher explains lessons?

You can choose more than one answer

- Arabic
- French
- English

9 How often do you find difficulties in understanding the teacher's lecture in English?

- Always
- Often
- Sometimes
- Rarely
- Never

10 Do you think your current English level affects your ability to follow the lessons?

- Yes, it affects me a lot.
- Somewhat, but I manage.

- No, it doesn't affect me.

11 Is the English course assigned to you helpful?

- Yes
- No

Why:.....

12 Do you feel confident using English in class?

- Yes
- Sometimes
- No

13 How often do you use English to participate in class?

- Always
- Often
- Sometimes
- Rarely
- Never

14 What languages do you prefer to use to participate in the class?( you can choose more than one answer)

- Arabic
- French
- English

15 How often do you avoid participating in class because of your English skills?

- Always
- Often
- Sometimes
- Rarely
- Never

16 do you find difficulties asking questions in English?

- Yes
- Sometimes
- No

17 What language do you use when taking notes? ( you can choose more than an answer)

- Arabic
- French
- English

18 Did the use of the English language in exams affect your grades?

- Yes
- No

In what ways:

- Misunderstanding the question
- Using the wrong words in the answer.

Others:.....

19 Do you feel that using English will help you in your field?

- Yes
- No

why:.....

20 Do you have any suggestions for making it easier to use English as the main language in your classroom?

.....

## " تحقيق حول تنفيذ التدريس باللغة الانجليزية في قسم الرياضيات "

يهدف هذا الاستبيان إلى جمع البيانات حول تطبيق اللغة الإنجليزية كوسيلة للتدريس في قسم الرياضيات. نرجو منكم التفضل بالإجابة على الأسئلة التالية. ستظل إجاباتكم سرية

1 ما هو جنسك ؟

ذكر  انثى

2 ما هو عمرك؟

من 17 الى 20  من 21 الى 30  ما فوق 30

3 ما هو مستواك في اللغة الانجليزية؟

منخفض  متوسط  ممتاز  جيد

4 هل تابعت دروسا للغة الانجليزية قبل الدخول اوانشاء الجامعة

نعم  لا

اذا كانت الإجابة بنعم، هل يمكنك توضيح المزيد عن نوع الدروس وما الذي تركز عليه؟ (يمكنك اختيار - اكثر من اجابة )

قواعد اللغة (grammar)  مهارة القراءة (reading)  
 مهارة التكلم (Speaking)  مهارة الكتابة (writing)  
 القدرة على (listening) فهم الكلام  
 أخرى .....

5 كم مرة يستخدم أستاذك اللغة الإنجليزية في القسم ؟

ولا مرة  نادرا  في بعض الاحيان  
 في كثير من الاحيان  دائما

6 ما هي اللغات الأخرى التي يستخدمها أستاذك؟

الفرنسية  العربية  كلاهما

7 عندما يستخدم أستاذك لغة أخرى غير الانجليزية ، هل تجد ذلك مفيداً؟

نعم , فهو يساعدني على الفهم بشكل جيد  
 نعم في بعض الاحيان , ولكن افضل اللغة الانجليزية  
 لا , لا يساعد

8 ما هي اللغة التي تفضل ان يستخدمها استاذك في شرح الدرس؟(يمكنك اختيار اكثر من اجابة واحدة)

الفرنسية  الانجليزية  العربية

9 هل تشعر بالثقة في استخدام اللغة الإنجليزية في القسم؟

نعم  في بعض الاحيان  لا

10 كم مرة وجدت صعوبات في فهم محاضرة الاستاذ باللغة الإنجليزية

أبدا  نادرا  في بعض الاحيان   
في كثير من الاحيان  دائما

11 هل تعتقد أن مستواك الحالي في اللغة الإنجليزية يؤثر على قدرتك على متابعة الدروس؟

نعم، يؤثر علي كثيرا

إلى حد ما، لكنني أتدبر امري

لا، لا يؤثر علي

12 هل حصة اللغة الإنجليزية المقررة لك في الجامعة مفيدة؟

نعم  لا

-إذا كان جوابك لا فهل يمكنك توضيح ما ينقصها

13 ما هو عدد المرات التي تستخدم فيها اللغة الإنجليزية للمشاركة في القسم؟

أبدا  نادرا  في بعض الاحيان   
في كثير من الاحيان  دائما

14 ما هي اللغات التي تفضل استخدامها للمشاركة في القسم؟ (يمكنك اختيار أكثر من اجابة)

الانجليزية  الفرنسية  العربية

15 كم مرة تتجنب المشاركة في القسم بسبب مهاراتك في اللغة الإنجليزية؟

أبدا  نادرا  في بعض الاحيان   
في كثير من الاحيان  دائما

16 هل تجد صعوبات في طرح الأسئلة للأستاذ باللغة الإنجليزية؟

نعم  في بعض الأحيان  لا

17 ما هي اللغة التي تستخدمها عند تدوين الملاحظات؟ (يمكنك اختيار أكثر من اجابة)

العربية  الإنجليزية  الفرنسية

18 هل أثر استخدام اللغة الإنجليزية في الامتحانات على درجاتك؟

نعم  لا

- إذا كان جوابك بنعم هل يمكنك تحديد السبب (يمكنك اختيار أكثر من اجابة)

عدم فهم السؤال

استخدام الكلمات الخاطئة في الإجابة

أخرى: .....

19 وضح كيف يمكن لاستخدامك للغة الإنجليزية في دراستك أن يؤثر على مستواك العلمي والمعرفي في مجال تخصصك (الرياضيات)، سواء بشكل إيجابي أو سلبي؟

.....  
.....

20 هل لديك أي اقتراحات لتبسيط وتطوير استخدام اللغة الإنجليزية كلغة رئيسية في فصلك الدراسي؟

.....  
.....

## Appendix J: The Recommended ESP course

**Unit:** Introduction to Sets and Real Numbers

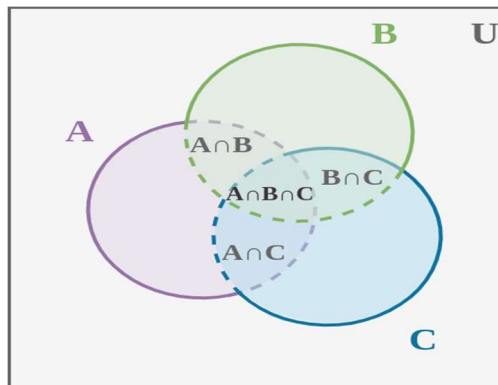
**The objectives:**

Understand and explain key mathematical terms related to sets and real numbers.

Identify and interpret standard set notation.

Extract and summarise the main ideas from a mathematical text.

- a- Pre-reading Activity:** Look at the picture and guess what the text of the reading will be about.



**Figure 1**

- b- While-Reading Activity:**

Read the text and answer the following questions

Every rigorous study of mathematics begins with certain undefined concepts, primitive notions on which the theory is based, and certain postulates, properties which are assumed to be true and given no proof. Our study will be based on the primitive notions of real numbers and sets, which will be discussed in this section.

We shall use standard notation for sets and real numbers. For example,  $\mathbb{R}$  or  $(-\infty, \infty)$  represents the set of real numbers,  $\emptyset$  represents the empty set (the set with no elements),  $a \in A$  means that  $a$  is an element of  $A$ , and  $a \notin A$  means that  $a$  is not an element of  $A$ . We can represent a given finite set in two ways. We can list its elements directly, or we can describe it using sentences or equations. For example, the set of solutions to the equation  $x^2 = 1$  can be written as

$$\{1, -1\} \text{ or } \{x: x^2 = 1\}$$

A Set  $A$  is said to be a subset of a set  $B$  (notation:  $A \subseteq B$ ) if and only if every element of  $A$  is also an element of  $B$ . If  $A$  is a subset of  $B$  but there is at least one element  $b \in B$  that does not belong to  $A$ , we shall call  $A$  a proper subset of  $B$  (notation:  $A \subset B$ ). Two sets  $A$  and  $B$  are said to be equal (notation:  $A = B$ ) if and only if  $A \subseteq B$  and  $B \subseteq A$ . If  $A$  and  $B$  are not equal, we write  $A \neq B$ . A set  $A$  is said to be nonempty if and only if  $A \neq \emptyset$ .

The union of two sets  $A$  and  $B$  (notation:  $A \cup B$ ) is the set of elements  $x$  such that  $x$  belongs to  $A$  or  $B$  or both. The intersection of two sets  $A$  and  $B$  (notation:  $A \cap B$ ) is the set of elements  $x$  such that  $x$  belongs to both  $A$  and  $B$ . The complement of  $B$  relative to  $A$  (notation:  $A \setminus B$ , sometimes  $B^c$  if  $A$  is understood) is the set of elements  $x$  such that  $x$  belongs to  $A$  but does not belong to  $B$ . For example,

$$\{-1, 0, 1\} \cup \{1, 2\} = \{-1, 0, 1, 2\}, \{-1, 0, 1\} \cap \{1, 2\} = \{1\}, \{1, 2\} \setminus \{-1, 0, 1\} = \{2\} \text{ and } \{-1, 0, 1\} \setminus \{1, 2\} = \{-1, 0\}.$$

Adopted from the book "Introduction to Analysis" (Wade, 2014, p.1)

**Figure 2**

1- Can you find and write all the math symbols in the text?

2- Link each paragraph with what it focuses on

- |    |   |
|----|---|
| P1 | The basic concepts in studying mathematics              |
| P2 | The relationship between different sets                 |
| P3 | How to write and understand set notation                |
| P4 | Set operations like union, intersection, and complement |

3- What are the primitive notions and postulates?

4- How can we represent a finite set?

5- What does " $a \in A$ " mean?

6- What is the difference between  $\subseteq$  and  $\subset$ ?

7- Give one example of a union and one of an intersection from the text

8-Match the symbol with its meaning:

- |             |                         |
|-------------|-------------------------|
| $\in$       | A. Union of sets        |
| $\emptyset$ | B. Empty set            |
| $\cap$      | C. Belongs to           |
| $\subset$   | D. Proper subset        |
| $\cup$      | E. Equals               |
| $=$         | F. Intersection of sets |

### c- post-reading

1-Fill in the gaps with the following words: intersection-  $\subseteq$ - primitive - notions- - equal - complement-  $\emptyset$ - union- Proof

- \_\_\_\_\_ are concepts assumed without definition, and postulates are properties accepted without \_\_\_\_\_ .

-The symbol \_\_\_\_\_ represents an empty set, while the notation  $A \subseteq B$  means  $A$  is a subset of  $B$ .

-Two sets  $A$  and  $B$  are considered \_\_\_\_\_ if they contain exactly the same elements.

-The \_\_\_\_\_ of two sets  $A$  and  $B$  (written  $A \cup B$ ) includes all elements that are in  $A$ , in  $B$ , or in both

-The \_\_\_\_\_ of  $B$  relative to  $A$  (written  $A \setminus B$ ) includes all elements in  $A$  that are not in  $B$ .

-The \_\_\_\_\_ ( $A \cap B$ ) includes only those elements that  $A$  and  $B$  have in common.

-The \_\_\_\_\_ of  $B$  relative to  $A$  (written  $A \setminus B$ ) includes all elements in  $A$  that are not in  $B$ .

2- Use your knowledge of sets to solve:

If  $A = \{1, 2, 3\}$  and  $B = \{3, 4\}$ , find:

1.  $A \cup B =$  \_\_\_\_\_
2.  $A \cap B =$  \_\_\_\_\_
3.  $A \setminus B =$  \_\_\_\_\_

## ملخص

يمثل عام 2023 عامًا مهمًا في تاريخ التعليم العالي الجزائري مع إدخال اللغة الإنجليزية كوسيلة للتعليم (EMI). تبحث هذه الدراسة الاستكشافية في استخدام EMI في جامعة تلمسان، مع التركيز بشكل خاص على طلاب السنة الأولى في قسم الرياضيات. تهدف إلى تحديد العقبات التي يواجهها كل من المعلمين والطلاب أثناء تعلم وحدات المحتوى باللغة الإنجليزية، وإيجاد حلول مستقبلية لتحسين التنفيذ. لذلك، ولتحقيق هذه الأهداف، تم جمع البيانات من خلال أربع ملاحظات صفية، وخمس مقابلات مع الأساتذة، و59 استبيانًا من الطلاب. كشف التحليل، الذي أجري باستخدام منهج متعدد الأساليب، أن كل من المعلمين والطلاب لديهم كفاءة منخفضة في اللغة الإنجليزية، مما يؤدي إلى صعوبات في التدريس والتعلم والتواصل الفعال. ومع ذلك، يمكن معالجة هذه التحديات من خلال التغييرات المناسبة. في نهاية الدراسة، يوصى بتزويد كل من الأساتذة والطلاب ببرامج دعم لغوي (ESP) وتعزيز ممارسات الترجمة اللغوية لتسهيل تحقيق نتائج أفضل في بيئة EMI.

**الكلمات المفتاحية:** التعليم العالي , الرياضيات , العقبات , الحلول , EMI, ESP

## Résumé

L'année 2023 a marqué l'histoire de l'enseignement supérieur algérien avec l'introduction de l'anglais comme langue d'enseignement, ou *English Medium Instruction* (EMI). Cette étude exploratoire examine l'utilisation de l'EMI à l'Université de Tlemcen, en se concentrant spécifiquement sur les étudiants de première année du département de mathématiques. Elle vise à identifier les obstacles rencontrés par les enseignants et les étudiants lors de l'apprentissage des contenus des modules en anglais, ainsi qu'à proposer des solutions pour améliorer sa mise en œuvre. Pour atteindre ces objectifs, des données ont été collectées au moyen de quatre observations en classe, de cinq entretiens avec les enseignants et de 59 questionnaires remplis par les étudiants. L'analyse, menée selon une approche mixte, a révélé que les enseignants et les étudiants ont une faible maîtrise de l'anglais, ce qui entraîne des difficultés à enseigner, à apprendre et à communiquer efficacement. Cependant, ces difficultés peuvent être surmontées par des ajustements appropriés. À l'issue de l'étude, il est recommandé de fournir aux enseignants et aux étudiants des programmes de soutien linguistique (ESP) et de promouvoir les pratiques de translangage afin d'améliorer les résultats dans le contexte de l'EMI.

**Les mot clés :** Enseignement supérieur, mathématiques, obstacles, solutions, EMI, ESP

## Summary

The year 2023 marked a turning point in the history of Algerian higher education with the introduction of English as a Medium of Instruction (EMI). This exploratory study investigated the implementation of EMI at the University of Tlemcen, focusing specifically on first-year students in the Department of Mathematics. It aimed to identify the challenges that both teachers and students faced while learning and teaching subject content in English and to propose possible solutions to improve its implementation. To achieve these objectives, data were collected through four classroom observations, five interviews with teachers, and 59 student questionnaires. The analysis, conducted using a mixed-methods approach, revealed that both teachers and students had limited proficiency in English, which hindered effective teaching, learning, and communication. However, these difficulties could be addressed through appropriate interventions. The study recommended providing both teachers and students with English for Specific Purposes (ESP) support programs and promoting translanguageing practices to improve outcomes in the EMI context.

**Key words:** Challenges, EMI, ESP, higher education, mathematics, solutions