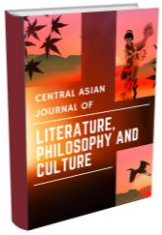

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Article

Examining the Challenges of English-Medium Instruction in Mathematics Among Iraqi Undergraduate Learners: According to Students' Perceptions

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Abstract: The increasing adoption of English as a Medium of Instruction (EMI) in higher education has raised significant concerns regarding its impact on student learning and comprehension, particularly in non-native countries. This study examines the challenges and perceptions of Iraqi undergraduate students studying mathematics through EMI. Using a descriptive approach, including surveys, the study investigates students' views on the effectiveness of EMI, its influence on motivation and confidence, and the difficulties faced in learning mathematical concepts in English. Findings reveal that while students recognize the benefits of EMI for their future careers, they struggle with language barriers, comprehension difficulties, and limited instructional support. The study highlights the need for improved EMI implementation strategies, enhanced teacher training, and tailored curriculum development to address student needs better.

Keywords: English-Medium Instruction, Mathematics Education, Higher Education, Language Barriers, Student Perceptions

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1. Introduction

The use of English as a medium of instruction in higher education has witnessed a significant global rise, driven by the increasing demand for English-taught programs in universities. This growth in English Medium Education (EME) is a response to the internationalization of higher education, as universities seek to attract a more diverse student body and enhance their global competitiveness. English-medium instruction (EMI) refers to the use of the English language to teach academic subjects, other than English itself, in countries where it is not the primary language. This phenomenon has become a growing global trend, with more and more higher education institutions offering undergraduate and postgraduate programs in English. The global role of English as a Medium of Education (EME) has substantial implications for teaching and learning, as well as for institutional and national language policies. (Macaro et al., 2018)

The increasing prevalence of English as a medium of instruction in higher education has raised important questions about its impacts on learning outcomes. As universities around the world adopt EMI to internationalize their programs, it is crucial to understand the implications of this shift for students' academic achievement and language proficiency. The use of English as a medium of instruction may pose challenges for both students and educators, particularly in non-Anglophone countries, where English is not the primary language.

Therefore, this study aims to examine Iraqi Math students' perceptions of studying Math in English in undergraduate education. By addressing this issue, the study aims to contribute to the existing literature on EMI and provide insights that can inform language policies and instructional practices in higher education institutions.

This study tries to answer the following research question:

a. How do math students perceive the role and effectiveness of English as a medium of instruction for studying mathematics?
b. How does using English as a medium of instruction affect students' motivation and confidence in learning mathematics?
c. What are the main challenges math students face when studying mathematics in English, particularly regarding language and comprehension?

Literature review

English Medium Instruction (EMI) has been the subject of several studies that have explored its impacts on learning outcomes. A comparison study conducted in Japan and Taiwan found that EMI students outperformed their non-EMI counterparts in terms of academic achievement (Al-Masheikhi et al. 2014, p.246). Another study conducted in Oman found that the EMI policy has been questioned since it does not provide students with equal opportunities to study at the tertiary level. The study also identified several challenges related to EMI, including content teachers' linguistic and pedagogic competence, students' English language proficiency, and reading disciplinary content in English (Belhiah & Elhami, 2014, p.652). A review of the literature on EMI found that prior exposure to EMI courses leads to improved academic outcomes.

Adopting English as a Medium of Instruction (EMI) has gained prominence globally, especially in higher education institutions. EMI involves using English to teach non-language subjects in contexts where English is not the first language (Dearden, 2014). This instructional approach aims to simultaneously enhance students' language skills and subject knowledge.

Researchers have explored the advantages and challenges of implementing EMI in various educational settings. In mathematics education, several studies have examined the implications of EMI. Tsui and Tollefson (2007) highlight how using English in teaching mathematics affects students' comprehension and problem-solving abilities, especially for learners with limited English proficiency.

Similarly, Probyn (2016) investigates EMI in South African classrooms, showing that while students develop their English skills, they often struggle with understanding mathematical concepts due to the linguistic complexities of word problems and technical terminology. Moreover, Wilkinson (2013) explores the implementation of EMI in Dutch universities, reporting that students in mathematics programs encounter significant challenges in grasping abstract concepts when instruction is not in their first language. Research in Asian contexts further illustrates the unique dynamics of EMI in mathematics education. For instance, Lin and Morrison (2020) analyze the cognitive load associated with learning mathematics in English among Chinese university students, identifying language proficiency as a critical factor influencing academic success.

Additionally, Ahmed and Hussain (2019) focus on EMI in Pakistani higher education, noting that the lack of subject-specific vocabulary and teacher preparedness often hampers students' understanding of mathematics. The significance of EMI lies in its ability to provide access to global opportunities and improve students' language proficiency.

According to Sah (2020), EMI facilitates the acquisition of both academic content and linguistic skills, offering socio-economic advantages to learners, particularly those from marginalized groups. Similarly, Vu and Burns (2014) highlight the dual benefit of

integrating English language learning with subject-specific content, arguing that it enhances students' overall academic and linguistic competence.

Rao (2019) underscores the pivotal role of English as a global language, asserting its widespread use in fields such as trade, technology, and education. The dominance of English, Rao notes, has made it an essential tool for global communication and knowledge dissemination. In Saudi Arabia, English has become a key education component, reflecting its importance in the global academic and professional landscape.

Al-Seghayer (2012) describes English as a vital element in Saudi educational settings, emphasizing its utility in preparing students for international engagement. This view aligns with Marsh's (2006) observation that the use of EMI has rapidly expanded worldwide, particularly in disciplines like engineering, science, and business, due to its perceived benefits for academic and professional growth. While the advantages of EMI are well-documented, its implementation is not without challenges.

Ryhan (2014) highlights the difficulties faced by Saudi students, many of whom lack adequate English proficiency when entering university. This language barrier often hinders their ability to comprehend subject content and affects their academic performance. Martinez (2016) echoes this concern, noting that both students and teachers in EMI contexts frequently struggle with insufficient English proficiency, which compromises the effectiveness of instruction. Yang et al. (2019) identify similar challenges in China, including limited resources, unprepared instructors, and ineffective classroom interactions, all of which contribute to students' dissatisfaction with EMI. One common issue in EMI contexts is the tension between focusing on language development and content mastery.

Martinez et al. (2020) argue that this balance remains a persistent challenge for both students and educators. Additionally, cultural and motivational factors play a significant role in students' adaptation to EMI. Aina et al. (2013) observe that the stress of studying in a foreign language can negatively impact students' confidence and learning outcomes. In Saudi classrooms, Ryhan (2014) notes that students often exhibit signs of disengagement, such as inattentiveness, which may stem from the cognitive burden of processing content in English. To address these challenges, some researchers advocate for integrating the native language into EMI instruction. Schweers (1999) suggests that allowing code-switching between English and the first language can enhance students' understanding and reduce resistance to EMI. Bradford (2016) highlights structural issues in EMI programs, such as inadequate course offerings and lack of coherence, which further hinder their effectiveness.

Al Zumor (2019) points out the psychological challenges associated with EMI, including anxiety and frustration, which are exacerbated by students' low English proficiency and sudden exposure to an English-only learning environment. Teacher preparation and curriculum design also play crucial roles in the success of EMI. Flowerdew (2016) emphasizes the need for specialized training to equip instructors with the skills to manage both linguistic and disciplinary demands in EMI classrooms. This preparation is particularly important for teaching English for Specific Academic Purposes (ESAP), where subject-specific language features require careful attention.

Despite the challenges, the growing prominence of EMI reflects its perceived value in preparing students for a globalized world. However, its successful implementation requires addressing key issues such as language proficiency, teacher training, and curriculum design. Further research is needed to explore adaptive strategies for overcoming these challenges and to assess the long-term impact of EMI on students' academic and professional success.

Although the growing body of literature on EMI and its implementation across various disciplines, there remains a significant gap in research specifically addressing the challenges and strategies related to EMI in mathematics education. While previous studies

have explored the advantages of EMI in enhancing students' linguistic and academic competencies (Sah, 2020; Vu & Burns, 2014), there is limited empirical evidence focusing on the unique linguistic and cognitive challenges faced by mathematics students in EMI contexts. Additionally, there is a need for more research that examines the long-term effects of EMI on students' language proficiency and academic achievement. Furthermore, there is a need for more research that explores the impact of EMI on students from different linguistic backgrounds and cultures. Overall, the existing research has shed light on the opinions of mathematics students who study mathematics in English, and whether they face any difficulties or challenges when studying mathematics in English.

Advantages of English Medium Instruction

English Medium Instruction (EMI) has been a topic of research, with a focus on its impact on language proficiency. The research findings indicate that EMI can lead to significant improvements in students' English language skills, as measured by tests like IELTS. However, there are also concerns about the potential challenges associated with EMI, such as the need for clear instructional goals, support systems for teachers and learners, and the specific needs of multilingual learners (Bray et al., 2014, p.133). While EMI is believed to improve students' English proficiency, some studies have found only modest increases in students' language proficiency, raising questions about the effectiveness of EMI in achieving its goal. Despite the growth of EMI, there is a lack of empirical research into its impact on students' English learning and content absorption, which is a major concern. The research also suggests that the perceived advantages of an EMI education, such as improved English language proficiency, may offer a competitive advantage in the workplace (Earls, 2016, p. 25). However, it is important to consider the specific context and the needs of the students when evaluating the effectiveness of EMI in enhancing language proficiency.

English Medium Instruction (EMI) in higher education is believed to offer several advantages for exposure to global perspectives. EMI is seen as a way to develop students into global language users and to support critical movements to resist linguistic and cultural isolation. The use of English as a medium of instruction is growing rapidly in higher education, driven by the practical need to access academic literature and participate in the global job market, where English is the dominant language (Hamid et al., 2013, p. 73). EMI is also seen to give students a double benefit: knowledge of their subject, plus English language skills, are perceived as essential for success in the global job market (Doiz et al., 2011, p.359). However, it is important to note that the effectiveness of EMI in providing exposure to global perspectives and enhancing language proficiency is still a topic of ongoing research and debate, and the impact of EMI on teaching, learning, and student outcomes requires further empirical research.

English Medium Instruction (EMI) is seen to provide a double benefit to students, offering knowledge of the subject and English language skills, which can increase access to international opportunities. EMI is believed to produce students with fluent English who can go on to study at top universities, thus increasing their access to international opportunities. However, it is important to note that the impact of EMI on teaching, learning, and student outcomes requires further empirical research. Therefore, while EMI is perceived to enhance language proficiency and provide access to international opportunities, the effectiveness of EMI in achieving these goals is still a topic of ongoing research and debate (Kirkgoz, 2009, p. 663).

English Medium Instruction (EMI) is believed to have the potential to improve cognitive skills. Research suggests that instruction through English provides an opportunity to exercise linguistic and cognitive flexibility, which facilitates the development of cognitive processes. Additionally, EMI is seen to give students exposure to the English language, enabling them to pick up other languages quickly, and bilingualism has been shown to have many cognitive benefits for children, such as

improved creativity, problem solving, and memory skills. However, it is important to note that the impact of EMI on cognitive skills and academic performance is still a topic of ongoing research and debate, and the effectiveness of EMI in achieving these goals requires further empirical research (Choi, 2013, p.658). Therefore, while EMI is perceived to have the potential for improving cognitive skills, the evidence supporting this claim is still being explored.

Challenges Associated with English Medium Instruction

English Medium Instruction (EMI) presents a set of challenges that educators and students often encounter, impacting the effectiveness of this instructional approach. One prominent hurdle is the issue of Limited English Proficiency among teachers. Many educators may grapple with communication difficulties due to their own inadequate English skills, lack of EMI training, and a prevailing belief among subject teachers that they are not proficient in English (Thomas, 2020, p.154). Additionally, linguistic challenges emerge for students participating in EMI, as they navigate specialized subject matter through a secondary language, potentially unfamiliar to them. This can result in difficulties comprehending lectures and maintaining high levels of concentration during the learning process (p. 159). Cultural challenges further complicate the EMI landscape, as disparities in the characteristics and expectations of students from different backgrounds influence the experience of both lecturers and teachers. This mismatch can create a disconnect that affects the overall effectiveness of the instructional approach.

Structural challenges constitute another layer of impediments within EMI. Issues related to students' language abilities and proficiency, suitable teaching methods, and inadequate resources such as instructional materials and expertise for reviewing and adapting available resources contribute to the complexity of EMI. Identity-related challenges within the institutional context are also prevalent. Concerns about students' insufficient English proficiency and lecturers' ability to effectively teach in English become central issues that need attention (Salton, 2005, p.261). To address these challenges, it is imperative to recognize the importance of implementing strategies and interventions that can enhance the proficiency of both educators and students in the English language. Acknowledging and actively mitigating these challenges is crucial for ensuring the effectiveness of EMI in facilitating learning and language proficiency.

Based on existing knowledge, EMI can potentially expose students to diverse cultural perspectives, leading to a more nuanced understanding of different cultures and identities. This exposure may help students develop a transcultural identity, allowing them to integrate various cultural influences and navigate cultural dissonance more effectively. Additionally, EMI can provide opportunities for students to join international and multicultural communities, further enriching their cultural experiences and aiding in the development of a more inclusive and adaptable identity (Aguilar & Rodriguez, 2012, p. 341). The academic performance of students, especially in the context of English Medium Instruction (EMI), has been the focus of extensive research, yielding noteworthy findings from various sources. One crucial revelation is the strong correlation between language competence and academic attainment. While age accounted for a small percentage of the variance in academic achievement, language competence emerged as the most influential factor, underscoring the pivotal role of language abilities in shaping academic performance (Bray et al., 2014, p. 142). Further investigations into the relationship between English language proficiency and academic performance among international students unveiled significant disparities based on self-perceived English language proficiency levels. Notably, students with higher self-perceived English language proficiency exhibited higher mean, emphasizing the impact of English language proficiency on academic success.

Longitudinal studies reinforced the association between language abilities and educational outcomes, indicating that adolescents with superior language skills generally

achieved higher educational outcomes by the end of secondary school (Cho, 2012, 21-4). Additionally, the impact of English-medium instruction (EMI) on language proficiency was explored, revealing statistically significant score gains across all four tested English-language skill areas after four years of EMI. Notably, the most substantial improvement was observed in speaking skills, followed by reading, writing, and listening (Probyn, 2006, p.400).

Furthermore, research suggested that EMI provides a platform for exercising linguistic and cognitive flexibility, facilitating the development of cognitive processes. learners educated through the English medium exhibited faster cognitive process development, indicating potential cognitive benefits associated with instruction in English. Collectively, these findings underscore the profound influence of language abilities, particularly English language proficiency, on academic performance. They also shed light on the potential cognitive advantages and the intricate relationship between language abilities and educational outcomes within the framework of English-medium instruction (Endow, 2018, p.17).

2. Materials and Methods

Research design

The three research questions were explored quantitatively using a descriptive design. It was carried out on Iraqi TEFL students at the BA level.

Participants

This descriptive study was conducted with 60 Iraqi male and female students aged (20--21), at the undergraduate level, majoring in Mathematics, at the College of Education, University of Kufa, Najaf, Iraq. The participants were native Arabic speakers. They were selected randomly by the researchers using the convenience sampling method.

Instruments

To meet the objectives of the present study, the following instrument was used:

The researchers conducted a pilot study of the questionnaire. To evaluate its suitability and validity, two specialists from the English Department at Kufa University's College of Education were consulted. Both experts hold a Ph.D. in ELT and have over five years of teaching experience. Their assessment confirmed that the questionnaire items were relevant and appropriate for the study participants.

Questionnaire

The questionnaire was developed by Alasmar (2023) See (Appendix A). It comprised three main parts and used a five-point Likert scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The first section contained five items designed to gather participants' general opinions on the implementation of EMI. Similarly, the second section included five statements, focusing on identifying participants' emotional perceptions of EMI. In contrast, the third section consisted of ten items, examining the challenges and difficulties participants encountered during the implementation of EMI. The researchers translated the questionnaire into Arabic to be sure all the participants would be able to understand all the items of the questionnaire.

Procedure

The study was conducted in several stages to ensure the effective collection and analysis of data. First, the researchers obtained approval from the College of Education at the University of Kufa to conduct the study. Then, a pilot study was carried out to validate the questionnaire, with input from two specialists in the English Department, both holding Ph.D. degrees in ELT and possessing over five years of teaching experience. Their feedback confirmed the relevance and suitability of the questionnaire items for the study participants.

Next, the researchers distributed the questionnaire to 60 undergraduate mathematics students at the University of Kufa. Participants were randomly selected using a convenience sampling method. Before completing the questionnaire, students were provided with clear instructions and informed consent was obtained, ensuring their voluntary participation.

After data collection, responses were compiled and subjected to descriptive statistical analysis. The results were then interpreted to address the research questions concerning students' perceptions of EMI, its impact on their motivation and confidence, and the challenges they encountered while studying mathematics in English. The findings were subsequently compared with existing literature to provide a comprehensive discussion of the implications of EMI in mathematics education.

3. Results

Art, **Addressing the First Research Question**

To answer the first research question, which explored how math students perceive the role and effectiveness of English as a medium of instruction for studying mathematics, students' responses to a questionnaire were subjected to descriptive statistics.

Table 1. Students' General Views on EMI Implementation.

Items	Likert Scale						
	N	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly disagree**	**Mean**
1. English is essential for studying mathematics at the university level.	60	--	1.7	11.7	60.8	25.8	4.10
2. Learning mathematics in English will benefit my future career.	60	--	.8	10.8	53.3	35.0	4.22
3. The use of English medium instruction is more effective than using the native language as the medium of instruction.	60	5.0	27.5	20.8	31.7	15.0	3.24
4. English medium instruction aligns with my preferred learning style.	60	.8	2.5	21.7	54.2	20.8	3.91
5. I understand mathematical concepts better when lessons are delivered in English.	60	16.7	52.5	17.5	10.0	3.3	2.30

The survey results reveal a complex yet insightful landscape of student perceptions regarding the use of English as the medium of instruction for mathematics at the university level. A significant majority of students (86.6%) strongly agreed or agreed that studying mathematics through English is necessary, with only 1.7% expressing disagreement, underscoring a strong consensus on the importance of English as the medium of instruction in higher education. This sentiment aligns with students' career aspirations, as 88.3% agreed or strongly agreed that learning mathematics in English would benefit their future careers, reflecting a clear recognition of English's role in global fields and professional opportunities. However, the data reveals a nuanced tension between students' aspirations and their learning experiences. While nearly half (46.7%) perceived English as the medium of instruction as more effective than instruction in their native language, a striking 75% reported that English as the medium of instruction aligns with their preferred learning style. Notably, a critical contradiction emerges in students'

comprehension outcomes: only 13.3% agreed or strongly agreed that they understand mathematical concepts better when lessons are delivered in English, whereas 69.2% disagreed or strongly disagreed. This highlights a significant gap between students' endorsement of English as the medium of instruction for its long-term advantages and their immediate academic challenge.

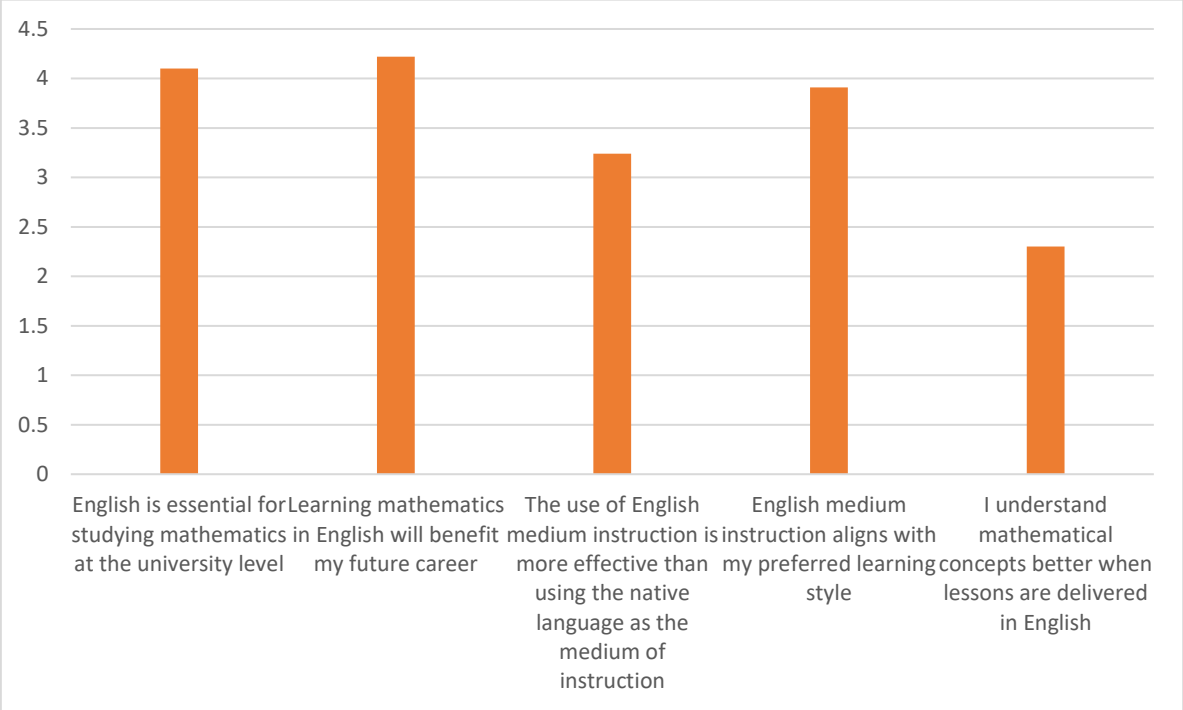

Figure 1. Students' General Views on EMI Implementation.

Addressing the Second Research Question

To answer the second research question exploring how using English as the medium of instruction affect students' motivation and confidence in learning mathematics, students' responses to questionnaire were subjected to descriptive statistics.

Table 2. Affective Perceptions Towards EMI.

Item	Likert Scale						
	N	Strongly disagree	Disagree	Neutral	Agree	Strongly disagree	Mean
6. English medium instruction increases my interest and motivation to study mathematics.	60	--	2.5	21.7	56.7	19.2	3.92
7. I feel confident learning mathematics when it is taught in English.	60	.8	3.3	13.3	59.2	23.3	4.00
8. English medium instruction makes mathematics lessons more engaging.	60	8.3	29.2	10.0	26.7	25.8	3.32
9. I enjoy learning mathematics when English is the medium of instruction.	60	9.2	20.8	20.8	44.2	5.0	3.15
10. English medium instruction helps me become more	60	.8	1.7	11.7	62.5	23.3	4.05

independent in solving mathematical problems.

The analysis of survey responses pertaining to the role of English as a medium of instruction in mathematics education yielded the following insights. A significant majority of respondents (75.9%) expressed agreement or strong agreement with the assertion that English as a medium of instruction enhances their interest and motivation to engage with mathematical studies, reflecting its perceived efficacy in stimulating academic enthusiasm. A notable majority of participants (82.5%) reported confidence in their ability to comprehend mathematical content delivered through English as a medium of instruction, suggesting alignment between instructional language and learner self-assurance. The data revealed divergent perspectives, with 52.5% of respondents agreeing or strongly agreeing that English as a medium of instruction increases the engagement level of mathematics lessons, while 37.5% expressed disagreement or strong disagreement. Moderate agreement (49.2%) was observed regarding the enjoyment of mathematics instruction delivered via English as a medium of instruction, contrasted with a substantial proportion of dissent (30.0%), highlighting a nuanced relationship between instructional medium and learner satisfaction. An overwhelming consensus emerged, with 85.8% of participants affirming that English as a medium of instruction fosters greater independence in addressing mathematical challenges, indicative of its perceived role in cultivating self-directed learning competencies.

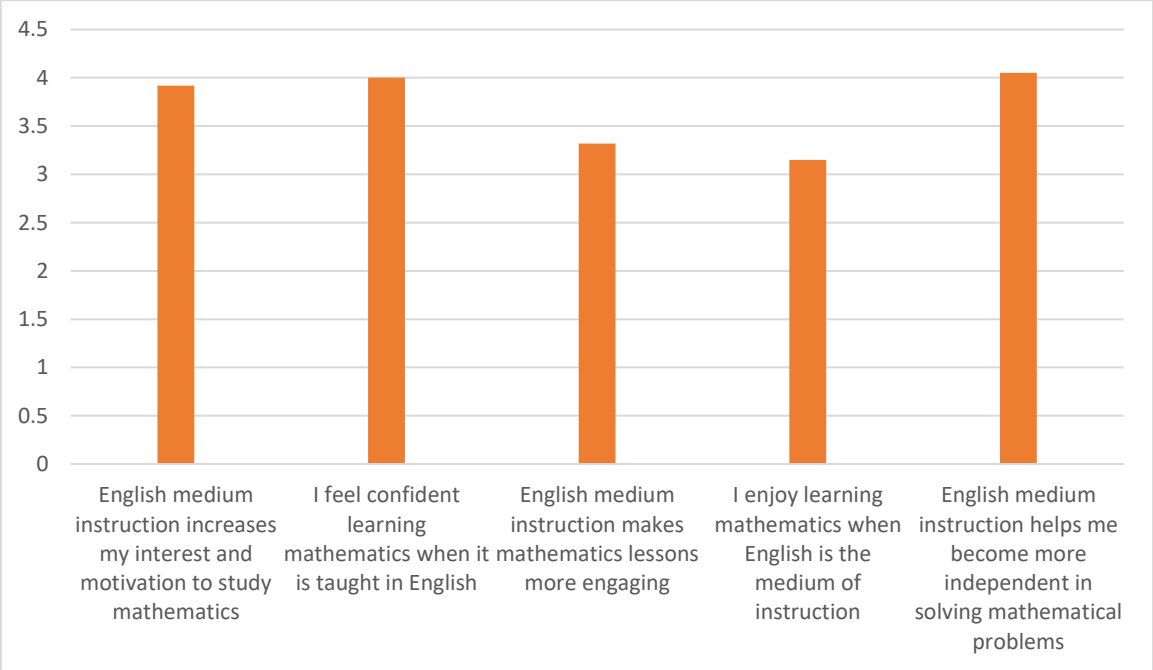

Figure 2. Affective Perceptions Towards EMI.

Addressing the Third Research Question

To answer the third research question exploring what are the main challenges math students face when studying mathematics in English, students' responses to questionnaire were subjected to descriptive statistics.

Table 3. Challenges and Difficulties in EMI Implementation.

Item	N	Likert Scale					Mean
		Completely unfair	Unfair	Undecided	Fair	Completely fair	
11. I find it difficult to understand mathematical concepts because of my limited English proficiency.	60	4.2	22.5	16.7	42.5	14.2	3.40
12. I struggle to focus on the mathematical content because I am distracted by trying to understand the English language.	60	.8	15.8	15.0	44.2	24.2	3.75
13. I have trouble understanding mathematical terms and symbols explained in English.	60	6.7	29.2	17.5	34.2	12.5	3.16
14. It is challenging when lecturers only use English without translating mathematical terms into my native language.	60	3.3	27.5	18.3	34.2	16.7	3.33
15. I face difficulties when I cannot use translation tools or resources during lectures.	60	2.5	30.0	15.8	41.7	10.0	3.26
16. The lack of code-switching between English and my native language makes learning mathematics harder.	60	.8	3.3	15.3	56.2	24.3	4.00
17. Mathematical textbooks and materials in English are difficult for me to comprehend.	60	--	2.5	15.0	68.3	14.2	3.94
18. The lecturer's limited ability to explain mathematical concepts in English makes learning harder.	60	--	5.8	11.7	52.5	30.0	4.06
19. I am not accustomed to studying mathematics in English, which negatively affects my learning process.	60	.8	21.7	26.7	25.8	25.0	3.52
20. My lack of motivation reduces my ability to study mathematics effectively in English medium instruction.	60	2.5	15.0	29.2	44.2	9.2	3.42

The analysis of student experiences with English-medium instruction in mathematics education highlights significant linguistic and pedagogical challenges, as reflected in the following findings. A majority of respondents (56.7%) identified limited English proficiency as a barrier to understanding mathematical concepts. Concurrently, 68.4% reported that efforts to decode linguistic content diverted their focus from engaging with mathematical material, underscoring cognitive overload caused by language barriers. Nearly half of the participants (46.7%) struggled to interpret mathematical terms and symbols delivered in English, though a substantial minority (35.9%) did not perceive this as a challenge, indicating variability in linguistic adaptation. Over half of the cohort (50.9%) emphasized difficulties when lecturers refrained from translating technical terms into their native language, contrasting with 30.8% who reported no such issue. Similarly,

51.7% faced obstacles in contexts where translation tools or bilingual resources were unavailable, while 32.5% remained unaffected, suggesting disparities in resource dependency.

An overwhelming majority (80.5%) identified the absence of code-switching between English and their native language as a critical impediment to comprehension. Furthermore, 82.5% cited lecturers' limited ability to elucidate mathematical concepts in English as a hindrance, highlighting systemic gaps in instructional clarity. A parallel majority (82.5%) struggled with English-language mathematical textbooks, while 50.8% attributed learning challenges to insufficient prior exposure to EMI in mathematics, reflecting institutional and curricular shortcomings. A significant proportion (53.4%) acknowledged that reduced motivation adversely impacted their capacity to engage effectively with EMI-based mathematics instruction, linking affective factors to academic performance. These findings collectively underscore the interplay of linguistic, instructional, and affective barriers in English-medium instruction contexts. While language proficiency deficits and inadequate pedagogical adaptations dominate as primary obstacles, variability in student responses signals the need for differentiated support mechanisms. The prevalence of challenges related to code-switching, lecturer proficiency, and textual accessibility calls for systemic reforms, including bilingual scaffolding, instructor training, and localized resource development, to align EMI implementation with learner needs and enhance equity in mathematics education.

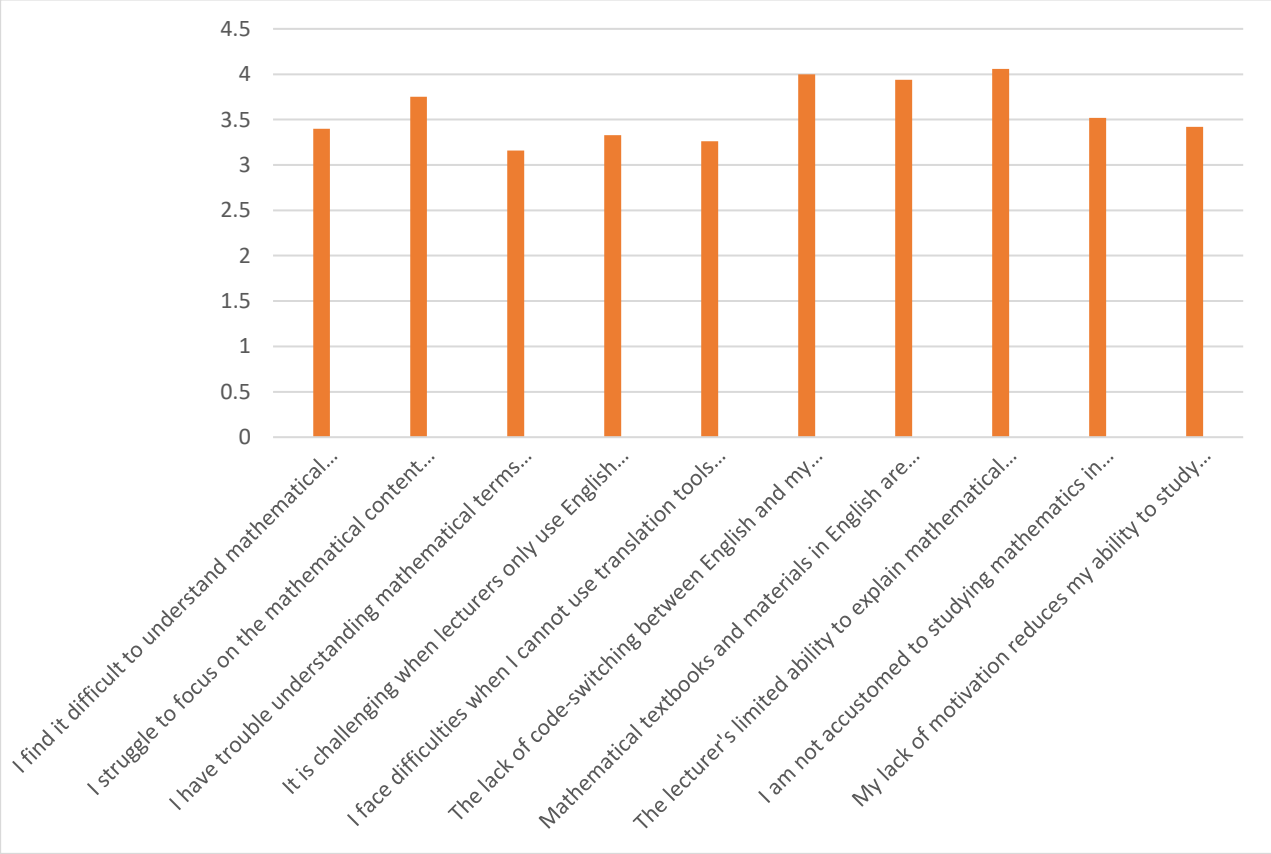

Figure 3. Challenges and Difficulties in EMI Implementation.

4. Discussion

The findings of this study agree with existing literature on EMI, highlighting both its advantages and challenges. Research by **Macaro et al. (2018)** and **Rao (2019)** supports the notion that EMI enhances students' English proficiency and prepares them for global opportunities. This aligns with our study's results, where a majority of students

acknowledged the career benefits of learning mathematics in English. Additionally, studies by **Sah (2020)** and **Vu & Burns (2014)** argue that EMI contributes to students' cognitive flexibility, allowing them to develop both language and subject knowledge simultaneously.

However, our findings also reflect concerns raised by **Probyn (2016)** and **Wilkinson (2013)**, who report that EMI students often struggle with mathematical comprehension due to linguistic challenges. Similar to our study, research by **Ahmed and Hussain (2019)** in Pakistan and **Yang et al. (2019)** in China identifies inadequate subject-specific vocabulary and teacher preparedness as major obstacles in EMI settings. Furthermore, the study supports **Martinez (2016)**, who highlights the tension between language proficiency and content mastery, a concern echoed by our respondents who reported difficulty understanding mathematical concepts in English.

While some scholars, such as **Marsh (2006)**, advocate for full EMI implementation to enhance global competitiveness, others, including **Schweers (1999)** and **Bradford (2016)**, suggest incorporating native language support through code-switching to ease comprehension. Our study supports the latter perspective, as a significant number of participants reported struggling due to the absence of bilingual instruction. This suggests that while EMI has long-term advantages, immediate support measures, such as teacher training and instructional scaffolding, are necessary for its successful implementation in mathematics education.

5. Conclusion

This study explored the challenges faced by Iraqi undergraduate mathematics students in an English-medium instruction (EMI) context, focusing on their perceptions of EMI's effectiveness, its impact on motivation and confidence, and the difficulties they encounter. The findings reveal that while students recognize the long-term benefits of EMI—such as improved English proficiency and enhanced career opportunities—they also face substantial obstacles, particularly related to language barriers, comprehension difficulties, and inadequate instructional support.

A key challenge highlighted in the study is students' struggle to grasp mathematical concepts due to their limited English proficiency. Many students reported that EMI creates cognitive overload, making it difficult to focus on both language and subject content simultaneously. Additionally, the lack of code-switching between English and Arabic, as well as instructors' limited ability to explain complex mathematical ideas in English, further complicates the learning process. Despite these difficulties, a significant number of students acknowledged that EMI enhances their motivation and confidence, indicating that with proper support, EMI can be an effective approach to teaching mathematics..

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