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Educational challenges and solutions for effective learning in EMI higher education: a systematic literature review

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ABSTRACT

This study synthesizes evidence on educational challenges and pedagogical solutions for effective learning in university-level English-medium instruction (EMI) programmes. Using PRISMA-guided systematic review methods, 61 studies were analysed to identify key challenges and corresponding solutions. Six domains influencing EMI effectiveness emerged: psychological, linguistic, cognitive, pedagogical, sociocultural, and organizational. Based on these domains, the study proposes curriculum development recommendations aimed at improving student academic performance, teaching quality, and programme feasibility. The findings offer a framework to enhance EMI implementation and support evidence-based curriculum design and teacher professional development.

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Introduction

The adoption of English-medium instruction (EMI) in higher education institutions has expanded rapidly in recent years, driven by global processes of internationalization and the growing demand for graduates capable of operating across linguistic and cultural boundaries (Block & Khan, 2020; Dafouz & Smit, 2020; Richards & Pun, 2022; Williams, 2015). EMI is commonly defined as the use of English to teach academic subjects other than English itself in contexts where English is not the first language of the majority of the population (Dearden & Macaro, 2016; Macaro et al., 2018). McKinley (2024) expands the definition of EMI by including the development of English for specific academic purposes (ESAP) as an integral part of the concept, as globalized education increasingly requires disciplinary language competence. Although the definition remains subject to scholarly debate, different perspectives offer a flexible conceptual framework for developing pedagogical practices.

Despite its anticipated benefits, a growing body of research has identified persistent challenges in implementing EMI (Qiu & Yuan, 2025; Smit, 2023; Zhou et al., 2025). As Akıncioğlu (2024) notes, these challenges include the need for systematic teacher training, ensuring adequate student language proficiency, and designing context-sensitive pedagogical approaches suitable for multilingual and multicultural learning environments. Another major concern is the absence of standardized criteria for

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evaluating instructors' ability to teach effectively through English, including among native speakers. Consequently, instructors with limited understanding of academic language development may fail to view language support as an integral part of their teaching role (Dafouz & Smit, 2020).

Although prior research has examined individual factors affecting EMI effectiveness, an integrated understanding of how they interact to support student learning remains limited. For example, more research is needed not only on the effectiveness of the language-learning strategies students use to address EMI challenges, but also on university teachers' perspectives on learning (Rose et al., 2026). Further research is needed to investigate both successful and problematic EMI implementations, with a focus on identifying educational solutions to inform curriculum design, teacher education, and instructional practice. In particular, Rose et al. (2026) highlight the need for research on pedagogy, sociolinguistic, and sociocultural factors. In response to these gaps, the present study synthesizes existing research on key factors influencing effective EMI learning in higher education and identifies pedagogical implications for curriculum development. Accordingly, the study is guided by the following research question: 'Within the educational ecosystems of English-medium instruction programmes in higher education, what challenges to effective learning are reported in the literature, what solutions are proposed to address them, and how can these findings be synthesized into actionable recommendations for improving learning in EMI?'

Theoretical background

Effective learning in EMI environments relies on aligning teaching methods with learning objectives, enhancing student performance, and fostering positive perceptions of course quality and institutional support (Richards & Pun, 2022). EMI effectiveness is commonly evaluated through institutional documents, stakeholder feedback, and empirical research, with emphasis on teacher competence, pedagogical approaches, learning support, and assessment practices. Addressing these dimensions is essential for improving learning outcomes.

Research on EMI in higher education highlights multiple interrelated factors shaping learning effectiveness. This systematic review identifies six key domains: psychological, linguistic, cognitive, pedagogical, sociocultural, and organizational, along with their associated challenges and solutions (Table 1). Together, these domains form an analytical framework that captures the multifaceted nature of academic success in EMI contexts, encompassing affective factors, language development, cognitive skills, teaching practices, intercultural dimensions, disciplinary literacy and institutional policies (Li et al., 2024; Macaro et al., 2020; Mittelmeier et al., 2021; Morell, Aleson-Carbonell, et al., 2022; Morell, Beltrán-Palanques, et al., 2022; Tai & Tang, 2021; Wilkinson, 2024; Williams et al., 2024).

In addition to these domains, three key educational components of EMI in higher education were identified: 'student academic performance, teaching quality, and EMI programme feasibility' (Table 2). Student academic performance refers to learners' regular activity directed towards achieving academic goals in EMI contexts. Research by de Diezmas et al. (2024), Xie and Curle (2022), and Yang et al. (2019) indicates that evidence for this component is typically drawn from academic outcomes, student perceptions, pedagogical interventions, and teacher feedback.

In this context, being proficient in English by itself is not enough. What also matters is academic literacy that aligns with the communication norms of particular disciplinary discourse, which requires complex academic support and scaffolding integrated into the curriculum (Hakim, 2026; McKinley, 2025). Teaching quality encompasses instructional strategies, assessment practices, preparedness to deliver content in English, EMI-adapted methodologies, and the institutional mechanisms that support effective teaching. EMI teaching quality also depends on structured modular training across key competencies such as pedagogy, professional confidence, communication, and discipline-specific instruction (Deroy, 2023; O'Dowd, 2018). This component reflects the perspectives of students, instructors, and administrators and is informed by studies on professional development and classroom observation (Carrió-Pastor, 2022; Doiz & Lasagabaster, 2023; Ma et al., 2024; Razkane et al., 2025; Sakrane, 2025; Williams et al., 2024). Finally, programme feasibility addresses the relationship between effective learning and institutional conditions, including EMI regulations, curriculum design, and resource allocation. Research in this area frequently employs surveys, interviews, and document analysis to examine how policy frameworks

Table 1. Domains of effective learning in research studies.

No.	Domain of effective learning	Researched alone	Researched in a combination	Researched in total
1	Psychological	8	8	16
2	Linguistic	7	16	23
3	Cognitive	3	11	14
4	Pedagogical	7	15	22
5	Sociocultural	0	8	8
6	Organizational	7	14	21

Table 2. Representation of educational components in research studies.

Domain of effective learning	Educational component	Number of studies
Psychological	Level of students' academic performance	13
	Level of teaching quality	3
	EMI programme feasibility	4
Linguistic	Level of students' academic performance	11
	Level of teaching quality	10
	EMI programme feasibility	9
Cognitive	Level of students' academic performance	8
	Level of teaching quality	7
	EMI programme feasibility	3
Pedagogical	Level of students' academic performance	4
	Level of teaching quality	17
	EMI programme feasibility	9
Sociocultural	Level of students' academic performance	4
	Level of teaching quality	2
	EMI programme feasibility	4
Organizational	Level of students' academic performance	4
	Level of teaching quality	15
	EMI programme feasibility	16

and infrastructure influence the sustainability of EMI programmes. Documenting the outcomes of EMI using these research tools can support programme accreditation and inform improvements in institutional policies (Deroy, 2023; Jinghui, 2023; Lo & Othman, 2023; O'Dowd, 2018; Sahan, 2021).

Despite the growing body of research, several persistent issues continue to undermine the quality of education in EMI contexts. A limited understanding of students' needs, superficial learning, inadequate pedagogy, resistance to incorporating elements of English language learning, and lecturers' tendency to position themselves solely as content specialists are identified as key challenges (Block & Moncada-Comas, 2022; Zhou et al., 2025). These concerns are also noted by Wingate (2025), who argues that institutions often assume language issues are resolved once students pass tests and complete preparatory courses, neglecting the need to support discipline-specific language development. In addition, resistance to pedagogical change among instructors, students' undervaluation of academic acculturation, and failure of home and host institutions to provide appropriate orientation further constrain the potential of internationalized education (Hajar et al., 2025; Lasagabaster & Doiz, 2021; Malmström & Pecorari, 2021; Mancho-Barés & Aguilar-Pérez, 2020). Some findings suggest that poorly planned EMI implementation may reinforce educational inequality by expanding access for a small elite while limiting it for the wider population (Ben Hammou et al., 2025; Ntombela, 2025).

Examining both successful and unsuccessful EMI implementations is essential, as insights from such analyses can inform the design, planning, and delivery of effective programmes, as well as teacher education, university management, and curriculum development (Yuan et al., 2022). Systematically identifying and categorizing educational challenges and solutions is, therefore, a critical step toward establishing a practical framework for improving EMI pedagogy and institutional practices in higher education.

Materials and methods

Search strategy

A systematic literature search was conducted in the Scopus and Web of Science (Clarivate) databases to ensure broad coverage of high-quality, peer-reviewed publications. The search included articles published between 2015 and 2025 and was limited to final-stage, peer-reviewed journal articles, excluding

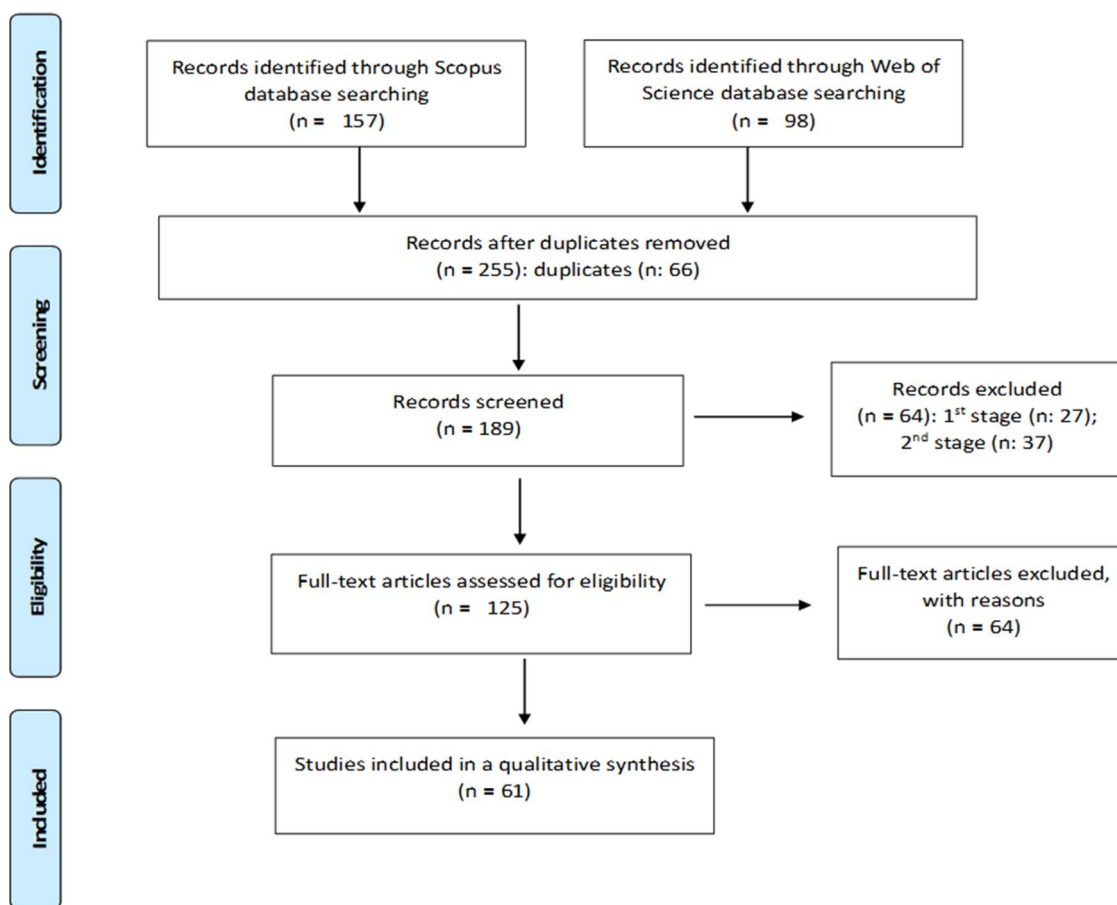


Figure 1. PRISMA flow diagram illustrating the study selection process. A PRISMA flow diagram illustrates the number of literature sources identified, screened, assessed for eligibility, and included in the review, along with the number of records excluded at each stage.

editorials, conference abstracts, and book reviews. Only English-language, open-access studies were considered to ensure relevance and full-text accessibility.

The same keyword string, combined using Boolean operators (AND, OR), was applied across both databases: (“English medium instruction” OR “EMI” OR “English-medium instruction” OR “EMI setting”) AND (“effective learning” OR “learning improvement” OR “curriculum development” OR “professional development” OR “teacher training” OR “students’ perspective” OR “educational ecosystem” OR “academic performance” OR “pedagogical solution*” OR “educational solution*” OR “teaching technique*” OR “teaching strategy” OR “teacher’s mastery”). Keywords were selected based on the research question and refined through a preliminary literature review, with truncation (*) used to capture variations of key terms.

Eligibility criteria

As of April 7, 2025, the database search yielded 255 records, which were exported in RIS format and managed using Zotero. After removing 66 duplicates, 189 unique studies remained for screening. Following the PRISMA protocol (Figure 1), screening was conducted in three stages: title review, abstract review, and full-text eligibility assessment.

At each stage, studies that did not meet the inclusion criteria were excluded. Title and abstract screening removed studies unrelated to EMI in higher education, those misusing the term “EMI,” those combining EMI with other instructional modes without disaggregated findings, and those lacking pedagogical relevance. Abstracts were also excluded if the primary focus shifted away from EMI or research was limited to a single skill or competence within an EMI setting. To ensure inter-rater reliability, a second reviewer independently screened a random sample of 40 records (21%) at the title and abstract

stage. Agreement between reviewers was assessed using Cohen's kappa. Substantial agreement was observed ($\kappa = 0.75$). Discrepancies were resolved through discussion until consensus was reached. The remaining records were screened by the first reviewer. As a result, 27 titles and 37 abstracts were excluded, leaving 125 articles for full-text review.

Following full-text eligibility assessment, studies were excluded due to insufficient methodological description or unclear target populations (2); focus on the impact of EMI on external variables rather than factors influencing effective learning in EMI (13); identification of challenges without proposed actionable solutions (13); absence of relevant development or outcome variables related to effective learning in EMI (e.g. student academic performance, teaching quality, or programme feasibility) (17); meta-research or lack of empirical data and recognised qualitative, quantitative, or mixed-methods analysis (4); and absence of reported outcomes or educational solutions (15). This process resulted in the exclusion of 64 studies and a final sample of 61 articles.

Upon a final selection, a qualitative thematic analysis was conducted to identify recurring challenges and solutions related to effective learning in EMI higher education. Relevant data were extracted and coded according to emerging themes, with all inclusion and eligibility judgments. These themes were then synthesized across studies to identify common patterns. The results of this process are presented as concise thematic summaries, with references to the studies that most directly address each issue. Educational solutions were identified through cross-study thematic synthesis, linking commonly reported challenges across sources with corresponding responses articulated more explicitly in others.

Table 1 summarizes the number of studies addressing each domain of effective learning, both independently and in combination, based on the selected literature.

The linguistic domain emerged as the most frequently examined area, underscoring the close association between EMI learning and language competence. In contrast, the sociocultural domain received the least scholarly attention and was never analysed independently, appearing only in combination with other domains. This pattern suggests that aspects such as intercultural competence, learners' sociocultural backgrounds, and the creation of equitable and inclusive learning conditions are only partially explored in the EMI research landscape.

As shown in **Table 2**, studies examining educational components across domains were systematically analysed. Most addressed multiple domains simultaneously, reflecting the interconnected factors shaping effective learning in EMI contexts. Teaching quality within the pedagogical domain received the most attention, highlighting the importance of teacher training, professional development, experience, and teacher-student interaction.

Furthermore, EMI programme feasibility and teaching quality within the organizational domain were widely examined, highlighting sustained scholarly interest in policy development and institutional support for EMI implementation.

Results

To address the research question, it is essential to identify the key educational challenges, as they reveal the difficulties encountered in implementing EMI courses at universities. Similarly, educational solutions are strategies proposed to mitigate these challenges and achieve successful outcomes. In analysing challenges (Ch-s) and solutions (Sol-s) across domains of effective learning and educational components, the most frequently reported (MFR) items were identified and summarized in the tables below. Frequencies were derived from a full-text analysis, in which recurring themes were identified and problems were systematically matched with their corresponding solutions.

Table 3 shows that students' motivation and confidence are shaped by lecturer training quality, curriculum design, prior learning experiences, and assessment pressures, all of which influence engagement in EMI contexts (de Diezmas et al., 2024; Prapunta, 2024; Zhou & Curle, 2026). Accordingly, students value instructors who are supportive, responsive, and provide constructive feedback that fosters academic progress and sustained engagement (Lee, 2023; Li, 2024; Zhou & Thompson, 2023). Task-based and cooperative learning approaches have also been found to reduce anxiety, sustain engagement, and enhance skill development. In particular, group project work has been shown to enhance students' confidence, fluency, and communicative competence for beginner students. The studies, based on student

Table 3. Educational challenges and solutions in the psychological domain of effective learning.

Educational component	Educational challenges & solutions	MFR	MFR
		Ch-s	Sol-s
Students' academic performance	<p>Challenge Need for individualized academic advising and support related to stress, adaptation, and learning motivation.</p> <p>Solution Structured collaborative and group work and the setting of appropriately challenging goals to build confidence.</p>	5	6
Teaching quality	<p>Challenge Instructor insecurity and stress arising from limited EMI experience.</p> <p>Solution Open communication around learning tasks and deliberate promotion of active participation, interest, satisfaction, constructive feedback, and emotional reflection.</p>	3	3
EMI programme feasibility	<p>Challenge Negative attitudes toward top-down EMI policies and low faculty motivation.</p> <p>Solution Clear EMI teaching and assessment standards supported by accreditation, mentoring, and multilingual policies tailored to disciplinary needs.</p>	3	3

interview data and supported by language assessment results, indicate that participation in group discussions, workshops, presentations, and other forms of collaborative learning can strengthen both self-efficacy and language performance (Huang, 2024; Islam & Stapa, 2021). Learning objectives should therefore be appropriately challenging yet attainable, encouraging interaction and enabling students to experience success and develop self-efficacy without the discouragement associated with repeated failure (Chou, 2023).

The integration of supplementary English courses alongside the EMI programme is essential for fostering a positive and coherent L2 self-concept that can guide both short- and long-term learning goals. Moreover, the acquisition of self-regulated learning strategies enables students to translate these goals into effective academic practices (Li, 2024; Zhou et al., 2025). Lee (2023) further notes that encouraging students to independently explore subject-specific terminology prior to instruction strengthens comprehension and increases confidence in using English.

Instructors in EMI settings often experience reduced motivation due to concerns about language proficiency, limited professional development opportunities, and the dual responsibility of supporting both content and language learning, which can lead to increased stress and anxiety (de Diezmas & Barrera, 2021; Lo & Othman, 2023). Sustained institutional support and continuous professional training are therefore essential. Encouraging emotional reflection and self-awareness can strengthen instructors' confidence and professional identity, while positive collegial relationships and a sense of belonging can mitigate fatigue and negative affect (Li et al., 2024; Ma et al., 2024).

To support this, higher education institutions should establish comprehensive training frameworks that recognize and accredit lecturers' linguistic and pedagogical competencies. These should include specialized EMI courses on academic language use, teaching methodologies, and expert supervision (de Diezmas & Barrera, 2021). Without adequate support, EMI initiatives may lead to frustration and disengagement, particularly when top-down management practices undermine teacher motivation (de Diezmas & Barrera, 2021; Li et al., 2024). Universities should therefore promote participatory environments that support meaningful teacher-student interaction and ongoing professional and emotional development. Flexible EMI policies based on shared goals, participatory decision-making, and clear multilingual strategies can provide coherent guidance on recruitment, training, accreditation, supervision, and incentives (de Diezmas & Barrera, 2021; Kim et al., 2021; Li et al., 2024).

Building on the affective and motivational concerns identified in the psychological domain, the linguistic domain highlights the central role of language proficiency and instructional support in effective

Table 4. Educational challenges and solutions in the linguistic domain of effective learning.

Educational component	Educational challenges & solutions	MFR Ch-s	MFR Sol-s
Students' academic performance	<p>Challenge Insufficient language support, particularly for discipline-specific lexis.</p> <p>Solution Integrated scaffolding through preparatory courses, CLIL/ICLHE hybrids, and concurrent ESAP/specialized language instruction.</p>	5	6
Teaching quality	<p>Challenge: Need for teacher language training to manage EMI classrooms.</p> <p>Solution Professional development to strengthen linguistic proficiency and structured collaboration between EMI content instructors and language specialists.</p>	6	10
EMI programme feasibility	<p>Challenge Lack of clear language proficiency standards, monolingual policies, and language-context mismatches.</p> <p>Solution Context-appropriate translingual policy and institutional support for language development programmes with diverse purposes.</p>	6	10

EMI learning. As shown in Table 4, this domain was among the most frequently examined in the reviewed studies, underscoring the importance of language competence in EMI contexts.

Across all educational components, limitations in students' English proficiency and instructors' linguistic preparedness were consistently identified as significant challenges. Students' language-related difficulties, particularly in mastering discipline-specific terminology, often impede comprehension, communication, and academic performance. To address these challenges, the literature emphasizes the need for supplementary English courses alongside the EMI programme or language-learning components integrated into instruction (Dabeel, 2024; Kamaşak & Sahan, 2024; Rahmanova & Ekşi, 2023; Reynolds et al., 2023). In this regard, ESAP and CLIL approaches are frequently recommended, as they integrate content and language learning through targeted workshops, supplementary support, and sustained linguistic scaffolding (Aizawa, 2024; Kim et al., 2021). EMI preparatory courses that focus on discipline-specific vocabulary development are also effective in enhancing students' linguistic readiness (Aizawa & Rose, 2020).

With regard to EMI teacher professional preparation, the absence of structured teacher training, professional development, and standardized qualification requirements constrains instructors' ability to develop linguistic and pedagogical competence (Alhassan, 2021; Sarkar et al., 2021; Shao & Rose, 2024). To mitigate this gap, studies call for comprehensive pre-service and in-service training aligned with institutional EMI policies, as well as closer collaboration between EMI content instructors and EAP specialists to ensure coherent language support and assessment practices (Abdeljaoued, 2023; Alanazi & Curle, 2025; Ege et al., 2022).

Finally, limited institutional support, including the lack of training opportunities for EMI teachers and the expectation that they prepare learning materials independently, along with top-down policy approaches, have contributed to negative stakeholder perceptions of EMI. Unclear competency standards and insufficient recognition of translingual practices further undermine programme quality (Kim et al., 2021; Marcjanik, 2023; Williams et al., 2024). The strategic use of the first language (L1), particularly for complex concepts, is therefore recommended as a pedagogical resource to enhance comprehension, reduce cognitive load, and promote deeper engagement in EMI classrooms (Kim et al., 2021; Rahmanova & Ekşi, 2023).

As shown in Table 5, the cognitive domain encompasses the mental processes involved in knowledge acquisition, information processing, and higher-order thinking in EMI contexts. The reviewed studies

Table 5. Educational challenges and solutions in the cognitive domain of effective learning.

Educational component	Educational challenges & solutions	MFR	MFR
		Ch-s	Sol-s
Students' academic performance	<p>Challenge Difficulty processing content due to limited English and academic proficiency, combined with limited thinking and learning strategy use.</p> <p>Solution Explicit advising on thinking and learning strategies to strengthen core academic skills and reduce cognitive load.</p>	6	5
Teaching quality	<p>Challenge Instructional communication barriers that hinder comprehension.</p> <p>Solution Training in metadiscourse and signalling techniques to clarify content and promote academic skill development.</p>	5	5
EMI programme feasibility	<p>Challenge Limited attention to cognitive strategy development and academic challenges.</p> <p>Solution Adjustments to teacher training and curricula to address cognitive dimensions (reflection, higher-order thinking, deep understanding).</p>	3	2

(Aizawa, 2024; Tai & Tang, 2021) indicate that high linguistic proficiency does not necessarily lead to deeper cognitive engagement or effective learning strategies. Processing complex disciplinary content in a non-native language may cause cognitive overload, resulting in fatigue, confusion, and reduced attention, particularly when instructional materials and tasks are poorly structured (Lee, 2023; Zhou et al., 2025).

Instructional communication barriers belong to the cognitive domain, as they interfere with information processing and increase cognitive load, thereby limiting comprehension (Sweller et al., 2011). To mitigate this, the literature emphasizes the importance of supporting students' use of cognitive, meta-cognitive, and signalling strategies to activate processes involved in monitoring, organising, and guiding comprehension (Molino, 2018). Effective approaches include training in listening comprehension strategies (e.g. identifying key concepts, paraphrasing, and summarizing), as well as providing opportunities for planning, self-questioning, and identifying knowledge gaps, all of which promote learner autonomy and self-regulation (Lee, 2023; Xie & Curle, 2022). In addition, the implementation of pre-session intensive courses is recommended to strengthen students' foundational academic and linguistic competencies prior to participation in EMI programmes (Hadingham, 2023).

From the instructional perspective, continuously monitoring student comprehension in EMI classrooms is both demanding and time-intensive (Aguilar-Pérez & Khan, 2022; Alhamami, 2023). EMI lecturers need to know how to combine written materials and interactive resources effectively so that subject content is conveyed more clearly and easily to students (Carrió-Pastor, 2022). In addition, lecturers should allow more time for students to respond, recognizing that processing the language and formulating an answer may require additional cognitive effort (Doiz & Lasagabaster, 2023). Targeted professional development is needed to strengthen instructors' use of strategic questioning and metadiscourse to support higher-order thinking, clarify content, and facilitate language development. Reflective teaching practices may further help identify strengths and areas for improvement (Lasagabaster & Doiz, 2024; Molino, 2018; Pusey, 2020).

At the programme level, EMI effectiveness is reduced when students lack sufficient academic or linguistic preparation. Without institutional support for critical thinking, academic literacy, and communication skills, instructors face greater challenges in content delivery (Hadingham, 2023; Pusey, 2020). These issues can be addressed through coordinated faculty and student development initiatives, including access to teaching resources, pedagogical training, and workshops to strengthen students' study and analytical skills (Yang et al., 2019). Together, these measures foster cognitively sustainable EMI ecosystems that support both student autonomy and teaching quality.

Table 6. Educational challenges and solutions in the pedagogical domain of effective learning.

Educational component	Educational challenges & solutions	MFR Ch-s	MFR Sol-s
Students' academic performance	Challenge Insufficient academic skills for EMI coursework. Solution Promoting active participation through explicit development of effective learning strategies.	3	4
Teaching quality	Challenge Shortage of pedagogical professional development and need for EMI-specific instructional training. Solution Pedagogical trainings that equip instructors with professional communication strategies, content presentation techniques, and interactive pedagogies to ensure clarity, engagement, and interaction readiness.	12	6
EMI programme feasibility	Challenge Lack of teaching guidelines and inconsistent EMI competence standards. Solution Clear teaching and assessment standards tailored to each EMI course.	4	5

The pedagogical domain emphasizes instructional quality, teaching methods, and classroom interaction as key determinants of effective learning in EMI contexts. As shown in Table 6, students often struggle with academic skills, active participation, and communication challenges intensified by limited English proficiency and insufficient preparation time. Instructors' linguistic limitations and ineffective pedagogical practices can further hinder academic achievement (Alhassan et al., 2021; Guo et al., 2024; Islam & Stapa, 2021).

To enhance engagement and learning outcomes, EMI courses should adopt learner-centred approaches that integrate content, language, and learning strategies aligned with students' needs, supporting meaningful knowledge construction (Alhassan et al., 2021; Zhang & Hu, 2024). Problem-based learning can further promote interaction and engagement, while student motivation and readiness should be considered in admissions and placement (Guo et al., 2024; Yang et al., 2019).

Across EMI contexts, instructors consistently report the need for institutionalized professional development to improve classroom engagement and ensure context-appropriate instruction. Many require targeted pedagogical training, particularly in contexts where EMI is newly implemented or expanding (Ma et al., 2024; Pusey, 2020; Sahan et al., 2021; Shao & Rose, 2024). A methodological component is essential to help EMI instructors refine their teaching practices. In particular, without a professional command of communication strategies and semiotic resources, it is difficult to present content clearly and engagingly (Morell, Aleson-Carbonell, et al., 2022; Morell, Beltrán-Palanques, et al., 2022). Professional development initiatives should therefore support instructors in implementing interactive pedagogies, such as guided discussions, online debates, and peer assessment, which foster collaboration, critical thinking, and student interaction (Sato et al., 2023). As Shen (2025) notes, such initiatives should also strengthen instructors' awareness of students' language-related challenges and promote the use of evidence-based strategies to address them.

At the institutional level, EMI teaching strategies should be adapted to specific disciplinary and contextual needs. A gradual approach to language integration can help instructors balance their roles as content specialists and language facilitators. Systematic needs analyses, based on lecturer consultation and course-specific data, can inform evidence-based training programmes (Ekoç-Özçelik et al., 2025; Shao & Rose, 2024). Stakeholder satisfaction increases when EMI programmes align with expectations for curriculum design, instructional quality, and assessment. Institutions should adopt flexible policies that support autonomy and collaborative goal setting, alongside clear, discipline-specific assessment guidelines. Effective EMI teaching thus requires not only language proficiency but also academic discourse

Table 7. Educational challenges and solutions in the sociocultural domain of effective learning.

Educational component	Educational challenges & solutions	MFR Ch-s	MFR Sol-s
Students' academic performance	Challenge Adjustment to academic and cultural expectations in EMI. Solution Learner-centred approaches that scaffold adaptation for diverse student backgrounds.	3	3
Teaching quality	Challenge Limited instructor sensitivity to multilingual/multicultural dynamics. Solution Professional development integrating intercultural competence training.	2	3
EMI programme feasibility	Challenge EMI introduced without sufficient regard for local linguistic/cultural contexts. Solution Internationalization of content that is responsive to institutional and regional sociolinguistic realities.	3	3

competence, language-responsive pedagogy, and collaboration with language specialists (Kim et al., 2021; Otto & Chichón, 2021; Zhang & Hu, 2024).

As outlined in Table 7, the sociocultural domain encompasses cultural, social, and contextual factors shaping participation, inclusion, and learning effectiveness in EMI settings. When students' political, economic, and social backgrounds are overlooked, barriers to academic success intensify. Differences in educational traditions, study-abroad experiences, and learning in a non-native language can increase stress and hinder adaptation, while limited family support, peer marginalization, and socioeconomic disadvantage further constrain performance. Universities are therefore encouraged to promote inclusive support through mentoring, cultural orientation, and academic workshops that foster discipline-specific learning strategies and intercultural understanding (Aizawa, 2024; Islam & Stapa, 2021).

EMI implementation is also challenged by limited strategic planning and insufficient stakeholder consultation, particularly with faculty. Strict English-only policies may be counterproductive in contexts where local languages hold strong sociocultural value. To address this, instructors require specialized training and sustained support to develop intercultural competence, while orientation programmes should prepare all stakeholders for EMI transitions (Galloway & Ruegg, 2022; Marcjanik, 2023).

Variations in language proficiency and academic backgrounds further complicate policy and curriculum design. Integrating cultural and social resources into EMI curricula can enhance relevance, inclusivity, and global perspectives, while clear communication of internationalization policies and alignment with local sociolinguistic contexts remain essential. To this end, higher education policymakers are advised to establish explicit, context-sensitive guidelines that clarify the roles of English and other languages while reflecting the local context and academic culture within EMI programmes (Ekoç-Özçelik et al., 2025; Jinghui, 2023; Mittelmeier et al., 2021; Shen, 2025; Yang et al., 2019).

The organizational domain refers to the institutional structures, policies, and administrative mechanisms that support effective EMI implementation (Table 8). Students frequently experience transition challenges related to academic expectations, interaction with peers and instructors, and participation in English-mediated communication, often compounded by unfamiliar tasks, materials, and assessment practices. To support successful adaptation, universities might offer ESAP courses and targeted academic support programmes that strengthen students' linguistic competence and academic literacy in their specific fields of study. Adequate institutional investment in language development and the integration of authentic, real-world communication tasks within EMI courses are therefore essential for enhancing student engagement and learning outcomes (Hadingham, 2023; Rahmanova & Ekşi, 2023; Sahan, 2021; Santoso et al., 2024).

A key challenge in the organizational domain is the lack of standardized criteria for assessing and developing EMI instructors' competencies, undermining programme quality and coherence. Limited

Table 8. Educational challenges and solutions in the organizational domain of effective learning.

Educational component	Educational challenges & solutions	MFR Ch-s	MFR Sol-s
Students' academic performance	Challenge Limited transitional/preparatory support for entry into EMI.	5	3
	Solution Systematic academic and language preparation and ongoing institutional support.		
Teaching quality	Challenge Insufficient institutional recognition/support and limited teaching materials.	6	6
	Solution Institutionally backed professional training and access to tailored teaching resources.		
EMI programme feasibility	Challenge Weak implementation planning, top-down decision-making, and inconsistent policy.	8	5
	Solution Flexible policies aligned with internationalization aims and future professional relevance.		

access to structured professional development and certification pathways often results in gaps in pedagogical preparation and understanding of bilingual education. Addressing these issues requires stronger institutional support, professional recognition, and greater trust in non-native English-speaking educators (Macaro et al., 2020; Marcjanik, 2023; Piquer-Piriz & Castellano-Risco, 2021). Universities should therefore implement systematic training frameworks to enhance pedagogical expertise, linguistic confidence, and the development of learner-centered, interactive EMI materials. Making EMI initiatives and effective practices visible across departments can further remove institutional barriers, promote collaboration, peer learning, and institutional capacity building (Ekoç-Özçelik et al., 2025; Marcjanik, 2023; Sahan, 2021). Additionally, university instructors could teach more effectively within a comprehensive language planning framework that clearly structures the implementation and evaluation of EMI (Sangkawong & Bucol, 2025).

EMI programme feasibility is often constrained by misalignment between top-down policies and teacher-led initiatives, resulting in inconsistent implementation and limited support (Pusey, 2020). Effective policy design should prioritize instructors' professional and pedagogical needs over administrative compliance (Uehara & Kojima, 2021). Sustainable implementation also requires access to linguistic support, cultural orientation, and robust technological infrastructure for digital and blended learning (Nguyen et al., 2025; Rahmanova & Ekşi, 2023). Accordingly, EMI curricula should remain flexible and adaptable, allowing continuous revision in response to institutional contexts, student needs, and empirical evidence (Ekoç-Özçelik et al., 2025). Emphasizing practical applications and adaptive learning strategies can better prepare students for globalized higher education.

Overall, findings across the psychological, linguistic, cognitive, pedagogical, sociocultural, and organizational domains highlight the interdependence of individual, instructional, and institutional factors in shaping effective EMI learning. This underscores the need for a holistic approach that integrates emotional, linguistic, cognitive, academic, and structural support within higher educational ecosystems.

Discussion

The systematic review was conducted in accordance with PRISMA guidelines, following the PICO framework and completing the PRISMA 2020 Checklist. The educational challenges and solutions identified across the six domains of effective learning provide actionable recommendations for developing EMI curricula and creating a favorable educational ecosystem. Aligned with the three educational components, students' academic performance, teaching quality, and EMI programme feasibility, these insights foreground the concerns of students, EMI instructors, and programme developers.

Chou (2023) states that sustaining motivation, building confidence, and providing emotional support for both students and instructors can be difficult given the ongoing self-regulatory demands of EMI. Evidence suggests that these challenges can be mitigated through collaborative learning, project-based tasks, and self-directed learning, for example, by organizing structured group discussions or peer presentations. In addition, targeted professional development can cultivate emotional intelligence, psychological literacy, and rapport-building. This may be organized as workshops on managing classroom

interaction, responding to student anxiety, and promoting effective interpersonal communication in EMI settings.

Supervision is particularly beneficial for less experienced EMI instructors, as it provides access to feedback, teaching materials, and pedagogical guidance from more experienced colleagues. However, implementing such a scheme requires careful planning, adequate expertise, and appropriate incentives (de Diezmas & Barrera, 2021). Institutions can further reinforce well-being and goal orientation by integrating supportive policies and curriculum-level mechanisms, particularly where limited EMI experience and language proficiency of students and lecturers may affect motivation and satisfaction (Kim et al., 2021; Li et al., 2024; Razkane et al., 2025).

Reynolds et al. (2023) and Williams et al. (2024) note that where linguistic support is inadequate, concerns about English proficiency among stakeholders increase. Language is integral to the processes of knowledge acquisition, construction, communication, and assessment, as it mediates participation in disciplinary discourse (Wilkinson et al., 2024). The reviewed studies suggest a coherent set of remedies, including preparatory and supplementary English courses alongside the EMI programme, CLIL-integrated EMI, linguistic training for instructors, and systematic collaboration with English language specialists (Ege et al., 2022; Ekoç-Özçelik et al., 2025; Kim et al., 2021). It is also important to value student feedback within time-constrained settings and to monitor students' needs and expectations throughout a course (Zhang & Hu, 2024). At the institutional level, precise proficiency requirements, accessible language-learning resources, and principled use of other languages should be established (Jinghui, 2023; Lo & Othman, 2023; Shao & Rose, 2024).

Cognitive challenges, as identified by Hadingham (2023), Xie and Curle (2022), such as overload, distraction, and difficulty following and retaining information, are recurrent in EMI university settings. Students may benefit from explicit guidance on navigating academic genres and applying effective learning strategies through ESAP courses, which provide exposure to disciplinary discourse. Pre-lecture materials are particularly helpful for students with lower proficiency. (Alhamami, 2023; Zhou et al., 2025). It is essential to encourage students to engage with specialized, cognitively demanding content, as this underpins the proficiency required for success in both content and language learning (Lee et al., 2025). Correspondingly, instructors should receive targeted training in monitoring comprehension and in promoting active, strategic thinking (Aguilar-Pérez & Khan, 2022; Pusey, 2020). Moreover, teaching scaffolds and specific language support can reduce the double challenge of simultaneously handling a foreign language and developing new knowledge (Razkane et al., 2025).

Low language proficiency and uneven academic readiness among students, combined with variations in instructors' pedagogical and linguistic competence, can hinder coursework completion (Ben Hammou et al., 2025; Razkane et al., 2025; Shao & Rose, 2024). Adopting a learner-centred approach that integrates accessible content delivery with explicit strategy instruction improves engagement. For example, a lecturer may articulate information while simultaneously displaying the written text, thereby engaging both auditory and visual perception. Scaffolding content and language while monitoring comprehension are additional strategies that encourage participation and reduce unawareness (Morell, Aleson-Carbonell, et al., 2022; Sahan et al., 2021). Creating media content in which students present learned material in English and gamifying learning are also recommended to enhance knowledge retention. Simultaneously, as noted by Morell, Beltrán-Palanques, et al. (2022), instructors benefit from training that focuses on clear content explanation and facilitating peer learning. However, all teaching methods, curricula, and assessment practices need constant revision and modernization as global knowledge evolves (Sakrane, 2025). Sociocultural factors, including vulnerable socioeconomic circumstances, cultural distance, post-colonial impact of other languages on education, linguistic racism, and limited family or peer support, can negatively impact performance in EMI contexts (Aizawa, 2024; Ben Hammou et al., 2025; Hajar et al., 2025; Islam & Stapa, 2021; Marcjanik, 2023; Razkane et al., 2025). Institutions are encouraged to consider the diverse backgrounds of university teachers and their varying levels of experience in international settings, and to implement inclusive support programmes for them, such as mentoring, cultural orientation, community involvement, and discipline-specific academic workshops (Galloway & Ruegg, 2022; Shen, 2025; Siegel, 2026). Effective EMI implementation also requires policies that balance the role of English with local languages so that curricula align with international standards while remaining responsive to institutional sociolinguistic contexts and ensuring equitable access to knowledge (Ekoç-Özçelik et al.,

2025; Ntombela, 2025; Yang et al., 2019). Moreover, transitioning to EMI in systems where another foreign language already dominates should be introduced gradually, prioritizing multilingual approaches (Ben Hammou et al., 2025).

Finally, a poorly supported transition from L1 to EMI remains a substantial organizational challenge (Santoso et al., 2024; Sarkar et al., 2021), especially in institutions where EMI is implemented radically without considering that students' and teachers' access to language and financial resources is highly limited (Ntombela, 2025). The absence of structured EMI guidelines, adequate pre-departure and orientation training, comprehensive teacher preparation, and supervision hinders implementation of EMI programmes (Hajar et al., 2025; Piquer-Píriz & Castellano-Risco, 2021; Sangkawong & Bucol, 2025; Yuan et al., 2022). Addressing these gaps requires systematic and integrated language support, adaptable curricula, reliable access to teaching and learning resources, responsive policy development, and acknowledgment of instructional efforts (Alhamami, 2023; Nguyen et al., 2025; Yuan et al., 2022).

Concluding remarks

From a theoretical perspective, the rapid expansion of research on EMI, along with ongoing debates surrounding its definition, highlights the need for greater conceptual clarity and standardization. A clearer understanding of what constitutes EMI, including its scope and related approaches, is essential to raising stakeholders' awareness of the practices it may encompass. For instance, EMI may involve integrating language-learning elements into disciplinary teaching or adopting bi- and multilingual approaches in contexts where languages other than English are dominant.

This study contributes to the field by conceptualizing effective learning in EMI as a multidimensional construct that extends beyond the achievement of predefined learning outcomes. The findings demonstrate that effective learning is characterized by high levels of competencies and academic success across the psychological, linguistic, cognitive, pedagogical, sociocultural, and organizational domains. Importantly, learning outcomes in EMI are shaped not only by student performance but also by teaching quality, curriculum design, and institutional organization, shaping EMI as a complex educational ecosystem.

In terms of practical and policy implications, the study advocates for a comprehensive approach to identifying and addressing challenges in EMI. Rather than focusing on isolated issues, higher education institutions should consider overlapping and interacting challenges across multiple domains. The framework of challenges and solutions proposed in this paper can serve as a tool for programme evaluation, curriculum development, and institutional decision-making. Context-sensitive aspects relevant to the specific, locally oriented EMI educational ecosystems, but not reported in this paper, can be identified and congruently used within this framework.

The findings further suggest that institutional standards, teacher guidance, evaluation criteria, and coherent EMI policies can help align expectations among stakeholders. In addition, systematic monitoring of EMI implementation, including tracking baseline conditions, challenges, and progress, can provide a more reliable basis for curriculum design and policy development. Overall, the results underscore that implementing sustainable EMI requires alignment between top-down policy initiatives and bottom-up pedagogical practices to promote inclusion, equity, and academic quality in multilingual learning environments. This balance can be achieved by considering all identified educational challenges and their solutions across each presented domain of effective learning and each educational component, and by creating interdisciplinary opportunities within this framework to better integrate into the EMI setting. Moreover, encouraging students and university teachers to make decisions at their respective levels may lead to a better understanding of the learning flow among all parties.

Although all domains of effective learning are interconnected, linguistic challenges remain essential, as comprehension is fundamental to the EMI setting. The findings therefore support the integration of strategies from related approaches such as CLIL, ESAP, or bilingual education to strengthen language development alongside content learning. At the same time, EMI instructors need access to professional development opportunities that address both language proficiency and pedagogical practices. Incorporating insights from cognitive research in pedagogy is also essential to reduce cognitive load and promote accessible content delivery.

Finally, this study highlights key directions for future research, including the impact of effective pedagogies on EMI outcomes, the development of EMI-specific approaches that support comprehension, and the role of metacognitive strategies in facilitating language and content processing across different proficiency levels.

Despite these contributions, several limitations should be acknowledged. The review focused on the most frequently reported challenges and solutions, potentially excluding less visible yet contextually significant factors. In addition, the identification of learning domains relied on interpretive thematic analysis and therefore involved a degree of subjectivity. Geographical factors and various proficiency levels were not examined, as the analysis prioritized cross-contextual patterns in EMI challenges and solutions. Thus, this may limit the extent to which region-specific differences and variations in participant characteristics are reflected. As the database search and selection process for the systematic review were completed before April 7, 2025, studies published subsequently were not eligible for inclusion in the Results section. The findings of this literature review indicate the need for future research to strengthen and extend the proposed framework through longitudinal and mixed-method studies across diverse contexts. Further investigation is particularly needed in underexplored areas, including sociocultural dynamics, digital transformation in EMI, and the long-term effects of translingual and intercultural pedagogies on student outcomes.

Author contributions

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Data availability statement

No datasets were generated during the current study. All data used in this review are derived from published literature. The authors confirm that the data supporting the findings of this study are available within the article.

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