ISSN 1799-2591
Theory and Practice in Language Studies, Vol. 14, No. 12, pp. 3687-3698, December 2024
DOI: https://doi.org/10.17507/tpls.1412.03

Exploring Learning Strategies of Students Studying in English-Medium Instruction Courses: A Case Study in the Thai Context

Thanatcha Ngamchatturat
School of Foreign Languages, Suranaree University of Technology, Nakhon Ratchasima, Thailand

Thidaphorn Jumpakate
School of Foreign Languages, Suranaree University of Technology, Nakhon Ratchasima, Thailand

Sirinthorn Seepho*
School of Foreign Languages, Suranaree University of Technology, Nakhon Ratchasima, Thailand

***Abstract*—Despite the abundance of research focusing on the perspectives, challenges, and needs of students learning English as a Medium of Instruction (EMI), there is a lack of studies examining the learning strategies employed by students in different academic disciplines. To fill this research gap, this study investigated the most common learning strategies adopted by students in EMI programs and explored the factors influencing their choice of strategies. The study was conducted at a university in Thailand, involving 40 students from medical and engineering schools. A qualitative research design, utilizing an inductive approach, was employed, with data collection conducted through focus group interviews. The thematic analysis revealed that participants primarily relied on cognitive, language-focused, social, and affective strategies. Nevertheless, only a small number employed metacognitive strategies. Furthermore, four main factors—language barriers, content-related issues, tests and assessments, and anxieties—were found to influence students' selection of learning strategies. Pedagogical implications suggest that Instructors should enhance technological integration, provide language support, offer supplementary study materials, and encourage metacognitive activities to motivate students to reflect on their learning experiences. Collaborative learning and a supportive classroom atmosphere are also essential for EMI courses.**

***Index Terms*—English-medium instruction (EMI), factors, learning strategies**

I. Introduction

English-medium instruction (EMI) is the practice of using English as the primary language for teaching academic subjects, excluding English itself, in regions where the predominant language differs from English (Macaro et al., 2018). In other words, EMI entails delivering content subjects like mathematics, science, and social studies in English instead of the students' native languages. This instructional approach allows students to cultivate proficiency in their academic disciplines while concurrently improving their English language skills (Dafouz & Camacho-Miñano, 2016; Macaro et al., 2018; Rose et al., 2019).

Over the past few decades, EMI has emerged as a global phenomenon, driven by globalization and internationalization. This trend is notable in tertiary education across various regions worldwide (Dearden, 2014; Macaro et al., 2018), particularly in non-Anglophone countries. Research on EMI has been conducted across different contexts to better understand its implications and challenges. Dearden and Macaro (2016) investigated the perspectives of college instructors in Austria, Italy, and Poland regarding teaching academic subjects in English. Meanwhile, Rose et al. (2020) conducted a comprehensive study on EMI policy and implementation in Chinese higher education, involving surveys of teachers and students, analysis of policy documents, and interviews with stakeholders. Hengsadeekul et al. (2014) explored the attitudes and motivations of Thai undergraduates enrolled in EMI programs, while Tang (2020) examined lecturers' perspectives on EMI challenges and their impacts on Thailand International College. These studies collectively highlight the global reach and significance of EMI, as described by Macaro (2018) as "an unstoppable train that has already left the station" (p. 232).

Due to academic and economic driving forces, the university where this study took place also offers some EMI courses for undergraduate levels. These courses are taught by English-speaking instructors, who are responsible for delivering instruction, creating teaching materials, and assessing students' performances in English. The EMI courses demand students to be proficient in both the subject matter and the English language. However, many students, especially those whose first language isn't English, frequently struggle to balance their academic workload with

* Corresponding Author. Email: sirin@sut.ac.th

language acquisition. This pressure to excel in both areas can lead to increased anxiety and potentially hinder their academic performance.

Although numerous studies have examined the perceptions, difficulties, and needs of students in an EMI environment (e.g., Corrales et al., 2016; Kym & Kym, 2014; Phuong & Nguyen, 2019; Su & Kong, 2023; Yıldız et al., 2017; Volchenkova, 2023), there remains a gap regarding the learning strategies employed by students in such settings. This gap is particularly notable in the context of the university under investigation, where a significant portion of students demonstrate varying levels of English proficiency, ranging from A2 to C2 according to the Common European Framework of Reference for Languages (CEFR). Because of this diverse proficiency range, it prompts an inquiry into how these students engage with and thrive in EMI classrooms. Therefore, the primary objectives of this study are to explore the most commonly used learning strategies among students in EMI courses and to investigate the factors influencing students' choices of learning strategies. The findings are expected to inform institutions and instructors on how to provide effective pedagogical approaches and support for EMI students, especially those in English as a Foreign Language (EFL) contexts.

II. Literature Review

The term 'strategies' or 'learning strategies' has been defined in different ways. Oxford (1990) defines learning strategies as intentional efforts undertaken by learners to facilitate their learning to be faster, easier, more pleasant, more self-directed, more efficient, and more transferable to new circumstances, whereas O' Malley and Chamot (1990) went further and defined learning strategies as cognitive processes and actions employed by learners to enhance their understanding, acquisition, and retention of knowledge. O' Malley and Chamot defined learning strategies as a diverse set of tactics encompassing organizing or elaborating on new information during the encoding process, focusing on specific aspects of the new information, analyzing and monitoring information during acquisition, assessing the learning after it is finished, or reassuring oneself that the learning will be successful to reduce anxiety. It can be summed up that learning strategies are conscious and deliberate actions taken by learners to enhance their learning process.

Rubin (1987) differentiated between strategies that directly or indirectly contributed to language learning: learning strategies, communication strategies, and social strategies. According to Rubin, learning strategies play a crucial role in language learning and can be categorized into two main types: cognitive strategies and metacognitive strategies. Cognitive strategies encompass a range of techniques aimed at acquiring, interpreting, and integrating linguistic information, comprising six primary strategies: clarification/verification, guessing/inductive inferencing, deductive reasoning, practice, memorization, and monitoring. Metacognitive strategies, on the other hand, involve deliberate efforts to organize, oversee, and regulate one's own learning process, thereby enhancing overall efficacy and autonomy. In contrast, communication strategies and social strategies are not directly linked to language learning. Rather, communication strategies emphasize the methods or purposeful plans to convey meaning, exchange ideas, and interact effectively with others, while social strategies are opportunities for learners to practice their knowledge and skills.

O'Malley and Chamot (1990) further developed this classification by dividing learning methods into three main categories: cognitive, metacognitive, and social-affective strategies. They explained that cognitive strategies pertain to how the brain processed language, including activities such as rehearsal, organization, inference, summarization, reduction, visualization, transfer, and elaboration. Metacognitive strategies involve reflective consideration of the learning process itself, including selective attention, planning, monitoring, and evaluating learning activities. Social-affective strategies encompass techniques used to manage emotional and social aspects of learning situations, such as cooperation, questioning for clarification, and self-dialogue. While O'Malley and Chamot (1990) provided a valuable framework for understanding learning methods, there might have been some overlaps among these strategies. For example, social-affective strategies, such as negotiating meaning with peers or assessing one's own contributions to group work, might have required cognitive and metacognitive involvement.

Expanding upon these foundational frameworks, Oxford (1990) made a distinction between direct and indirect language learning strategies, providing a nuanced understanding of the various approaches employed by language learners. Oxford (1990) pointed out that direct strategies encompass three principal categories: memory, cognitive, and compensation strategies. Memory strategies include methods for storing information, such as creating mental associations, utilizing visual and auditory aids, and engaging in systematic review processes, while cognitive strategies involve the mental processes by which learners construct meaning from their learning experiences, including practicing, analyzing, reasoning, encoding and decoding messages, and structuring both input and output. Compensation strategies are the techniques learners utilize to overcome gaps in their linguistic knowledge, such as predicting intelligently and overcoming limitations in speaking and writing. On the other hand, indirect strategies comprise metacognitive strategies, affective strategies, and social strategies. Metacognitive strategies involve specific approaches to regulate and optimize the learning process, such as planning, monitoring progress, and maintaining focus. Affective strategies prioritize the emotional and attitudinal aspects of learners during the learning process, aiming to reduce anxiety, foster self-encouragement, and monitor their emotional state. Social strategies equip learners with skills to effectively navigate interpersonal interactions, involving activities such as questioning, collaboration, and empathy.

These frameworks highlight the interconnectedness of cognitive, metacognitive, and socio-affective components in fostering proficiency in both direct and indirect language acquisition. Therefore, students should use a variety of

strategies in a balanced manner to enhance their efficacy and develop greater autonomy in their learning process. Shi (2017) provided an overview of each framework, as presented in Figure 1.

<table>
<tr><td rowspan="3">Rubin (1987)</td><td colspan="3">Direct Strategies</td><td colspan="3">Indirect Strategies</td></tr>
<tr><td colspan="2">Learning Strategies</td><td colspan="2">Communication Strategies</td><td>Social Strategies</td></tr>
<tr><td>Cognitive Strategies</td><td>Metacognitive Strategies</td><td colspan="2"></td><td></td></tr>
<tr><td>O'Malley & Chamot (1990)</td><td colspan="2">Cognitive Strategies</td><td colspan="2">Metacognitive Strategies</td><td>Social/Affective Strategies</td></tr>
<tr><td rowspan="2">Oxford (1990)</td><td colspan="3">Direct Strategies</td><td colspan="3">Indirect Strategies</td></tr>
<tr><td>Memory</td><td>Cognitive</td><td>Compensation</td><td>Metacognitive</td><td>Affective</td><td>Social</td></tr>
</table>

Figure 1. Excerpt From Shi's (2017) Classification of Language Learning Strategies

Several studies shed light on the strategies employed by students in EMI courses. Soruç and Griffiths (2018) explored strategies that students from different backgrounds used to cope with the difficulties of working in International Relations and Psychology classes at a Turkish university. Through qualitative interviews and observations, they found that students employed a variety of strategies to cope with the challenges of EMI, including linguistic strategies (such as code-switching, using dictionaries, and translation tools), cognitive strategies (such as organizing thoughts, asking questions, visualizing, using prior experience, clarifying, and thinking critically), social strategies (such as seeking help from peers and teachers), and affective strategies (such as staying motivated and managing anxiety).

In a similar vein, Ali (2020) examined the coping strategies of Omani students enrolled in an EMI engineering program, particularly addressing issues related to lecture comprehension. The study found that these students employed various techniques to cope with their difficulties, such as seeking help from classmates, using online resources, taking notes, and actively participating in discussions. Additionally, the students often relied on their native language (Arabic) and bilingual dictionaries as a support system when they encountered comprehension challenges in English lectures.

Furthermore, in Wilang's (2022) study on specific anxiety situations and coping strategies of 140 students in full EMI engineering programs, the findings illustrated that students encountered different factors contributing to specific anxiety situations, including communication apprehension, cognitive processing, course difficulties, and fear of failure. To cope with these anxieties, students employed a range of strategies, including reviewing lessons, seeking support from peers and teachers, utilizing online resources, translating, engaging in self-study, and employing relaxation techniques, such as deep breathing, positive thinking, and self-motivation.

Meanwhile, Muttaqin and Chuang (2022) assessed the learning expectations, challenges, and strategies of 177 university students in various EMI programs in Indonesia. The results showed that students employed various strategies to cope with challenges, including language-related issues, unfamiliar academic environments, and cultural differences. Initially, students used language learning strategies such as listening, speaking, reading, and writing to enhance their English competence. Additionally, they utilized cognitive and metacognitive techniques, such as managing time, asking for clarification, and adjusting to various learning styles. Social strategies, such as collaborating with peers and seeking help from teachers, were also used. Significantly, students applied digital technology as a tool for academic support and language learning.

Recently, the study conducted by Mao and Peng (2024) examined the use of learning strategies among Chinese university students who took courses taught in English. Their analysis covered multiple aspects, such as the frequency and types of strategies used, factors influencing strategy use, and students' perspectives on strategy efficacy. The results indicated that students commonly employed cognitive techniques, including rehearsal, organization, and elaboration, as well as metacognitive strategies, such as planning, monitoring, and self-evaluation. In addition, the study discovered the utilization of social and affective strategies, such as seeking help from peers or instructors and managing anxiety. However, students mostly relied on cognitive strategies in contrast to other strategies. Moreover, the study highlighted that students' choice of strategies was influenced by their language proficiency, motivation, and cultural background.

Although previous research offers valuable insights into the challenges and support strategies within EMI contexts, there is a scarcity of studies that thoroughly investigate how academic discipline, personal experiences, or institutional factors influence students' selection of learning strategies in EMI courses. This study seeks to complement previous research by analyzing commonly utilized learning strategies and the factors affecting their choices. Examining the primary learning strategies employed by students could strengthen the systematic comprehension of their learning processes in EMI environments. Moreover, examining the factors that affect students' selection of strategies may uncover the contextual components that influence their learning processes in EMI environments. Understanding these features can guide the development of support mechanisms to improve student success in EMI education. Consequently, the study examines two principal research questions: 1) What are the most commonly used learning strategies in EMI courses? and 2) What factors influence students' choice of learning strategies?

III. Methods

A. Research Design

This study employed a qualitative, inductive approach to explore students' learning strategies and the factors influencing their choices of learning strategies of undergraduate students in EMI programs. Focus-group interviews served as the primary tool of data collection as they could allow in-depth discussions and generate comprehensive qualitative data on students' experiences and perspectives on learning strategies. Furthermore, inductive approach allows researchers to draw broad conclusions that lead to the discovery of new themes and insights which have not been previously considered (Thomas, 2003).

B. Participants

A total of 40 undergraduate students voluntarily participated in this study. They were from three different disciplines: medicine (n=14), civil engineering (n=13), and mechanical engineering (n=13). All participants enrolled in the EMI courses at a university in northeastern of Thailand and had mix abilities of English proficiency levels, ranging from A2 to C2 on the Common European Framework of Reference for Languages (CEFR) scale. The principal rationale for selecting these three departments was their exclusive utilization of English as the medium of instruction, including all instructional materials and the language of instruction. Consequently, the participants were more capable of providing in-depth responses based on their experiences in EMI compared to students from other disciplines, especially in this context. The participants were those who indicated a willingness and interest in the research topic. Their demographic information was represented in Table 1.

Table 1
Participants' Demographic Data

Groups	Nationalities of participants (pseudonyms)	Departments	Year of study	CEFR levels
Group 1	• 3 Thai (Nan, Pek, Ging)	Medicine	2nd and 3rd year	A2
Group 2	• 4 Thai (Fah, Ken, Namtarn, Tung)	Medicine	3rd year	B1
Group 3	• 3 Thai (Phom, Boon, Olive)	Medicine	3rd year	B2
Group 4	• 4 Thai (Alice, Aoy, Natty, Ying)	Medicine	3rd year	C1-C2
Group 5	• 4 Thai (Gaew, Lora, Mana, Anne)	Civil engineering	4th year	B2
Group 6	• 4 Filipino (Cherry, Wilson, Jay, Opal)	Civil engineering	2nd year	C1
Group 7	• 3 Thai (Oat, Amp, Tony)	Civil engineering	3rd year	C2
Group 8	• 1 Burmese (Mona) • 1 Cambodian (Dave)	Civil engineering	2nd year	C1-C2
Group 9	• 5 Thai (Boom, Ivy, Lek, Joy, Bee)	Mechanical engineering	1st and 2nd year	A1-A2
Group 10	• 1 Thai (Dara) • 1 Lao (Ohm) • 2 Filipino (Dennis, Sara) • 1 Cambodian (Yue)	Mechanical engineering	2nd, 3rd, and 4th year	B1-B2
Group 11	• 2 Thai (Sirisuk, Amnat) • 1 Cambodian (Olie)	Mechanical engineering	3rd year and 4th year	C1-C2

Notes: A1 (Beginner), A2 (Elementary English), B1 (Intermediate English), B2 (Upper-Intermediate English), C1 (Advanced English), C2 (Proficiency English)

C. Research Instruments

The primary instrument in this study was focus group interviews. After an extensive literature review, three primary themes emerged, guiding the creation of a semi-structured interview guide: 1) The learning strategies employed by participants (including language acquisition, cognitive, metacognitive, social, and affective strategies), (2) their experiences in EMI courses, and (3) the challenges they encountered. Three researchers thoroughly verified these themes for their relevance to the study and cross-referenced them with prior research to ensure comprehensiveness. This semi-structured interview guide allowed participants to elaborate on their responses and facilitated a thorough exploration of such issues. Thai students were interviewed in Thai, while international students were interviewed in English. Thai students' responses were subsequently translated into English by three researchers to ensure accuracy and consistency. Each focus group interview took approximately one and a half hours. It was audio-recorded and transcribed before undergoing thematic analysis.

D. Data Collection and Analysis

After obtaining permission from lecturers, the researchers visited EMI classrooms in three faculties, Medicine, Civil Engineering, and Mechanical Engineering, to explain the study's purpose, procedures, significance, and informed consent process. Students interested in participating were invited to join focus group interviews after their classes. As a result, 40 students agreed to participate, all providing informed consent before the interviews. Once the data were collected, thematic analysis (Braun & Clarke, 2006) was employed to identify the most commonly used learning strategies and the factors influencing students' choices of strategies. In this process, the interview data were coded into themes and analyzed using an inductive approach. Member checking was incorporated to allow participants to review

and validate the analysis for accuracy. Excerpts from student interviews were emphasized to highlight the shared experiences of EMI students within this specific context.

E. Ethical Considerations

This study received ethical approval from the Institutional Review Board (IRB). Students' participation was voluntary, and they provided informed consent only after being fully informed of the research aims and procedures. Participation had no influence on their course grades, and students were explicitly informed of their right to withdraw from the study at any time or to decline to answer particular questions.

IV. Results

A. Learning Strategies Used by EMI Students

The data obtained from focus group interviews were transcribed and subjected to thematic analysis. The data reveal a diverse range of approaches categorized as language-focused, cognitive, metacognitive, social, and affective strategies. Key excerpts from the forty participants were then selected to highlight and support the emergent themes. The most common learning strategies reported by EMI students are summarized in Table 2.

TABLE 2
THE SUMMARY OF THE MOST COMMON LEARNING STRATEGIES USED BY EMI STUDENTS

Learning strategies	Sub-strategies	Study techniques
Language-focused strategies	Vocabulary Building	Used online and offline dictionaries to find the definitions of terminologies.
		Used Google Translate to translate words or sentences.
	Language Proficiency Development	Enrolled in English for Medicine or general English courses.
		Read English novels or watched English movies and series.
		Attended a writing training course to improve writing skills.
Cognitive strategies	Reviewing	Reviewed the lessons after class.
		Reviewed the lessons before class.
		Reviewed notes taken in Thai language after class.
	Using Technology	Learned from online resources (e.g., YouTube, e-books, websites, papers).
		Learned from applications (e.g., Osmosis, Atlas).
		Learned from relevant computer software/programs (e.g., AutoCAD, SketchUp).
	Finding main ideas or keywords	Found main ideas or keywords when studying or doing exams.
	Searching for visual aids	Searched for pictures or flow charts to help understand the complex ideas.
	Listening actively	Stayed focused when listening to lectures in English.
Metacognitive strategies	Monitoring	Highlighted or noted down any points that were hard to grasp for further study and research.
	Planning	Checked the course syllabus or course description to get an overview of lessons.
Social strategies	Seeking Help	Asked friends about difficult content and vocabulary.
		Asked lecturers about terminologies.
Affective strategies	Adapting	Took time to become familiar with the EMI courses.
	Changing mindset	Believed that even though the EMI courses were challenging, they could be beneficial for developing English and thinking skills.

(a). Language-Focused Strategies

Language-focused strategies were critical for students to bridge the gap between their current English proficiency and the demands of EMI courses. Students predominantly used language-focused strategies to enhance their understanding of English, particularly vocabulary building and language proficiency development. They relied heavily on dictionaries to comprehend technical terms and unfamiliar words, frequently employing tools like Google Translate for quick translations. In fact, every participant reported that dictionaries, including Google Translate, were crucial in translating both individual words and complete phrases and sentences, significantly enhancing their comprehension of the English-taught content.

> *When I encounter difficult words, I use the dictionary to translate them. If I can't find the words in the dictionary, I look them up on Google or a reliable website that isn't Wikipedia. Knowing vocabulary helps me understand the lessons better. (Oat, group 7)*

> *If there were any words or phrases I didn't understand, I had to translate them first so I wouldn't waste time in the classroom. (Tung, group 2)*

To improve their overall language skills, most Thai students reported that they required much time to get used to the EMI environment. One of strategies that assisted them to get through this was enrolling in different English language courses, including English for Academic Purposes, English Writing Courses, English for Engineering, and English for Medicine. Students reported that these courses helped them to have a solid foundation of language knowledge before they fully engaged in full EMI. In addition, many participants from engineering reported that they supplemented their learning by consuming English-language media, including novels, movies, and series, and attending writing training courses to bolster their writing abilities. The usefulness of English language courses was mentioned below.

> *The English for Medicine course was very helpful. It taught me a lot of new words, especially medical ones. (Pek, group 1)*

> *I used to struggle with writing. It was hard for me to express my thoughts clearly. But, after taking a writing course, I've improved a lot. Now, I can write much better and share my ideas more easily. (Ivy, group 9)*

(b). Cognitive Strategies

Cognitive strategies employed by the students reflected a structured approach to mastering course. A majority of the participants regularly reviewed their lessons both before and after classes, with some preferring to review notes taken in Thai to reinforce their understanding and retention. Excerpts are illustrated below.

> *When I want to understand something better or if there's a point in the lesson that I didn't quite grasp, I go back and review it after class. Reviewing after class helps solidify my understanding. And, if I have time, I usually review before class as well. Sometimes I'll review the PowerPoint slides that the teacher sent us beforehand, which helps me follow along better during the lecture. (Mana, group 5)*

> *When I encounter difficult content, I review it just like my friends do. Sometimes, reading the notes I've taken in Thai also helps. Even though we learn in English, I sometimes translate certain points into Thai. It makes it easier to understand, and when I review, I can remember it better. (Olive, group 3)*

Remarkably, the use of technology played a crucial role in their study habits. All participants reported that they used online resources such as YouTube, e-books, and websites to help facilitate their understanding of the subject matter. They mentioned that learning in EMI was challenging, and using these supplementary materials helped them significantly in grasping complex concepts. Particularly, many engineering students employed specialized software programs relevant to their studies, such as AutoCAD and SketchUp, to practice their engineering skills. Likewise, the majority of medical students, regardless of their English proficiency levels, utilized medical mobile applications, such as Osmosis and Atlas, to access comprehensive information and interactive materials. The incorporation of videos and images within these applications greatly facilitated their comprehension of medical concepts, as well as the etiology and pathology of various diseases. The following key excerpts showcase how students utilized technology in their learning process.

> *If the content is complicated, I prefer to use Osmosis, a medical app, to know more because it shows information about the causes, treatments, and videos describing the nature of the disease. It summarizes the content in short. The letters are cute and easy to read. It's very convenient and helpful. (Fah, group 2)*

> *After class, if I don't understand, I will go to YouTube for a more simplified explanation. Then, I summarize by writing the steps to solve the problems. Also, Coursera is a good and simple online learning resources. If I want to know about some specific engineering topics, I take a look at this website, too. (Dennis, group 10)*

Furthermore, when faced with lengthy and complex content during the examinations and study sessions, more than half of the participants from low and medium English levels preferred to find the main idea, central theme, or keywords when reading English texts or listening to English lectures. This helped them grasp the lesson more easily and pinpoint the important areas they needed to focus on. Active listening was another common method since it assisted students to keep attention and understand the teacher's explanations and instructions better. Furthermore, flow charts and images were also frequently employed as visual aids to simplify complex and abstract concepts. The excerpts are given as follows.

> *Most of the time, when I'm studying, I try to grasp the main points or identify the keywords in the lessons. This facilitates me to understand the material more easily and stay focused on the key concepts. (Anne, group 5)*

> *In pathology, we have to learn about the disease process, right? So, when I don't understand, I will go to applications like Calgary Guide, and type in the name of the disease I am interested in. It will appear as a flow chart explaining the disease in English. It helps me understand the process step by step. (Nan, group 1)*

(c). Metacognitive Strategies

Metacognitive strategies revealed students' self-awareness and their ability to regulate their own learning processes. Surprisingly, not many students mentioned their process to regulate their own learning. There were only two sub strategies reported by a small number of students. They reported that they commonly highlighted or noted down difficult parts for additional study and investigation. They also strategically planned by reviewing course syllabi or descriptions to have a general picture of forthcoming courses, enabling them to prepare more effectively.

> *If I don't understand something I've learned, I'll mark it and read it again or search for more details. (Natty, group 4)*

(d). Social Strategies

Social strategies highlighted the collaborative nature of learning in EMI courses. When facing difficult content or unfamiliar vocabulary, both engineering and medical students reached out for assistance. However, there was a difference since most medical students, regardless of their level of language competency, asked their peers for help. Among engineering students, on the other hand, it was mostly those with low to medium English proficiency (CEFR levels: A1-B2) who asked friends for help more frequently than those with high language competency. Surprisingly, few students sought advice from their teachers. Only a minority of medical students reported that they sought clarification from teachers, when unsure about specialized terminology, whereas some engineering students asked for help from their teachers when they did not understand the lessons.

> *When I don't understand the content, I always ask my friends for help. They are really nice. They help me all the time. (Lek, group 9)*

> *Whenever I have a problem during learning, I always ask my friends for help. (Yue, group 10)*

(e). Affective Strategies

Students employed affective strategies to cope with the emotional and psychological challenges of EMI courses. They admitted feeling nervous initially when studying in EMI, but they knew they had to motivate themselves and work on self-improvement. Over time, they gradually adapted themselves to the new learning environment. Additionally, many of them made a conscious effort to change their mindset, recognizing that despite the difficulties, EMI courses could significantly contribute to the development of their English language skills. The relevant excerpts are provided below.

> *Because my skills aren't good enough yet, I don't find studying enjoyable. But I always tell myself that I have to do it, I have to improve myself to understand it. (Bee, group 9)*

> *Throughout my studies from the first to the third year, it's been quite exhausting. It's all new material that I never encountered in high school. Since I decided to pursue this path myself even though it's hard, I have to keep going. If I give up, it'll cause problems. (Boon, group 3)*

> *It's like challenging myself. I mean, I studied English and used it a lot in high school, but after entering university, I might have forgotten some of it. Now, studying medical subjects in English feels like a way to refresh my knowledge. It's a challenge to see what I've forgotten and what new words I can learn to improve myself. (Alice, group 4)*

B. The Choices of Learning Strategies

The analysis revealed four key factors influencing students' selection of learning strategies in EMI classes: language barriers, content-related factors, the influence of tests and assessments, and anxieties. The results are demonstrated as follows.

(a). Language Barriers

The most relevant factor mentioned by students was language barriers. Many students identified vocabulary, English grammar, and English skills as elements impacting their EMI classroom learning experiences. Most students expressed that they had language difficulties, so they needed to find ways to manage these problems. Specifically, several students belonging to the CEFR B1-B2 levels had explicitly stated that technical terms in the text were the main obstacle impeding their understanding. The following excerpt sheds some light on how students evaluated the terminology as challenging.

> *I could bring up the subject of xxx. I found it challenging to keep up with the content, especially when it was in English. There were many complex terms involved. If I had had the chance to do it again, I would have focused more on preparing for those terms. (Lora, group 5)*

Furthermore, many students with moderate to high English proficiency (CEFR levels B1-C2) reported that their limited grammar and vocabulary negatively impacted their comprehension of the materials, as the English content was often more advanced than their proficiency levels. This hindered their ability to fully engage within the EMI courses. This excerpt highlights a struggle across all language skills.

> *When it comes to reading, I face the same issue as I do with listening and speaking, which is vocabulary. My vocabulary is quite weak, and it creates difficulties for me in reading, speaking, writing, and listening. (Ohm, group 10)*

As a result, students typically used the primary strategies to address the difficulties and develop their proficiency by translating, code-switching, using bilingual resources, enrolling in extra English courses, seeking help, and immersing themselves in English environment.

(b). Content-Related Factors

The second most mentioned was the difficulty and complexity of the content. Students expressed that the content was already challenging to learn in their first language (L1), and it was even more challenging when taught in English. They specified that some subjects were inherently difficult, and when explained them by using English, understand them caused more complication. Furthermore, some students pointed out that the English pronunciations and accents of different teachers also affected their comprehension. Each teacher had their own unique way of speaking, with varying levels of clarity, and this could impact the depth of their understanding. Accordingly, students supplemented their learning through independent study to bridge this gap. Notably, a number of medical students also revealed concerns that the teaching time allocated was not adequate with the excessive amount of content. They cited the example of the male pathology subject, which was expected to be completed within a three-hour. Given the vast amount of medical information involved, they felt that three hours were insufficient for proper learning and comprehension. As a result, they were compelled to seek additional information for further reading. The aforementioned reasons resonated with the opinions expressed by engineering students, as evidenced by the subsequent statement.

> *The thing is, we only have twelve weeks to cover a ton of material for one course, and it's not enough. Plus, we only get a one-week break between trimesters, so we're often completely wiped out. And honestly, the time we have to study before exams just isn't enough either. (Olie, group 11)*

(c). The Influence of Tests and Assessments

Students across all focus groups, even with high proficiency ones, reported that the exams were difficult. Their negative attitudes were presented in this part. Students revealed that they lacked confidence in English usage, especially productive skills: speaking and writing. They tended to think in their mother tongue (Thai) before translating into English. Thus, it was difficult to express their ideas in written tests sometimes. During the examinations, many students were required to employ thinking skills to analyze and solve the problems, remember vocabulary, and practice with past papers to become familiar with the exam questions. Students stated as follows.

> *The exam is very difficult. Sometimes we do the test that we have never done in the class before. How can we do the exam? So, I just click whatever choice on the test (guess). (Joy, group 9)*

> *We have to do the exam in English for both university and national license examinations. It is quite challenging. We have to know both content and language to understand the exam questions. I have to read and remember a lot of terminology. (Alice, group 4)*

> *The exam is very difficult. I need to prepare by reading the slides and searching for more information on the internet, Google, or e-book. I search for technical words and look at the illustrations to make them easier to remember. I think I need to find a lot of vocabulary to prepare for studying and taking exams. (Natty, group 4)*

(d). Anxiety-Related Factors

Students with limited backgrounds in EMI and low proficiency reported that they frequently felt anxious and lost confidence when they could not grasp the lectures or the materials. They were afraid that they were unable to answer the teacher's questions. Consequently, they had to take time to adapt themselves, check the course syllabus to get an overview of the lessons, review the materials, stay focused during lectures, and mark or highlight sections they did not understand to reduce their nervousness. The following excerpts illustrated their feelings.

> *Reviewing the lessons helps me to reduce anxiety. I felt upset when I couldn't catch up with the lessons in class. It was like when the teacher was teaching something, and I didn't understand it; it was distracting. I couldn't move on. (Ken, group 2)*

Sometimes, I feel nervous about answering questions in class. So, I have to listen carefully and pay attention to the teacher. (Dara, group 10)

V. Discussion

The findings accentuate the necessity of students having adequate language skills in order to effectively study and understand contents with English instruction. It is evident that students with language difficulties frequently encounter multiple academic challenges in terms of comprehending lectures, capturing course materials, articulating ideas, and performing satisfactorily in examinations; all of these could exacerbate a student's anxiety in EMI courses. This study, in line with the findings of Ali (2020), highlighted the significant use of dictionaries by students as a primary strategy to enhance their vocabulary acquisition and comprehension of academic and technical content and language. In contrast, this present study further reveals that students not only widely employed dictionaries and translation tools, especially Google Translate, but also participated in language programs as a key method to improve their English proficiency. The widespread use of these coping strategies can be attributed to the significant linguistic gaps between English and the students' native languages (e.g., Burmese, Cambodian, Lao, Tagalog, Thai). Even though translating is the primary step for initial comprehension, frequent translations may prevent students from the acquisition of more advanced language skills. Therefore, pedagogical practices should aim to reduce their reliance on translation and foster direct comprehension. Lecturers may integrate active or collaborative learning as a means for students to solve problems or discuss in English. These meaningful approaches could enable students to utilize English more spontaneously.

Besides affecting comprehension of the content, language difficulties also influence students' performance on exams by hindering their ability to accurately interpret questions and effectively express their knowledge. Specifically, even when students grasp the content well, difficulties in understanding or expressing themselves in English can prevent exams from accurately reflecting their true potential. Studies have shown that students typically score higher on exams in their native language compared to those in English, and this could highlight the negative impact of language barriers on academic performance (Bälter et al., 2023; Li & Wu, 2018). In addition, the pressure to perform well on exams can create additional anxiety and stress for students. To ensure fair assessment, teachers should consider students' language proficiency when designing and evaluating exams. Teachers may provide language support and accommodations, such as allowing extra time or the use of offline dictionaries, to help students feel at ease during the testing process.

Cognitive strategies were shown to be the most employed learning approach, mostly due to the challenging nature of the course content and the associated language challenges. To overcome these obstacles, students adopted a variety of strategies, specifically lesson review and technological use, to gain a deeper understanding of the course. The integration of digital resources and specialized software is consistent with research findings that highlight how technology can improve the outcomes of EMI programs (Ali, 2020; Muttaqin & Chuang, 2022; Vo, 2021; Wilang, 2022). Interestingly, some students chose to take notes in their L1 (first language) as a comprehension aid. This bilingual approach is consistent with research findings by Ali (2020) and the work by Cummins (2008) on bilingual education. It demonstrates a resourceful strategy that students employ to bridge the language gap and develop a more profound comprehension of the subject matter. Thus, employing the L1 as a language support tool could effectively scaffold students' content and language learning within the EMI context.

Surprisingly, it is concerning that both medical and engineering students demonstrated low engagement in metacognitive strategies, such as planning, monitoring, and evaluating their learning processes. This finding contradicts previous research by Mao and Peng (2024), which founds that EMI Chinese students commonly used metacognitive techniques to enhance their academic performance. The limited use of these strategies in the current study may indicate a lack of awareness or understanding of how to effectively implement them. In addition, the technical demands of EMI programs may lead students to prioritize cognitive and language-focused strategies over metacognitive ones. In other words, the dual challenges of complex content and language barriers may result in cognitive overload that reduces students' opportunities to engage in metacognitive activities.

Both EMI medical and engineering students commonly employed social strategies, particularly seeking assistance from friends. Peer support aligns with socio-constructivist learning theories, which emphasize the significance of social interactions in knowledge construction (Vygotsky, 1978). Engaging in discussions with peers allows students to learn collaboratively, correct misunderstandings, and aid their understanding of the subject matter. This result aligns with various studies exploring peer support within the EMI context (e.g., Ali, 2020; Mao & Peng, 2024; Muttaqin & Chuang, 2022; Soruç & Griffiths, 2018; Wilang, 2022). Nevertheless, the results showed that few students asked teachers for assistance, most likely because they lacked confidence or fear of judgment when asking questions in class. Some students did approach teachers when faced with unfamiliar terminologies or complex contents. This behavior reflects the importance of teacher support that is essential for grasping core contents of challenging material.

In addition, research findings revealed that many students enrolled in EMI programs experienced anxieties, partly due to their unfamiliarity with the learning system and limited language proficiency. Most students had transitioned from L1-based high school curricula to English-taught programs at the university level. So, those with limited EMI background and proficiency frequently experience several types of anxiety, including speaking anxiety, fear of negative evaluation, and general language anxiety (Le, 2023). High anxiety levels can discourage students from engaging in

classroom activities, limiting their active participation and opportunities to practice both subject matter and language skills. This can negatively impact their overall learning experience and performance on assessments.

VI. Conclusion

The main objectives of this study were (1) to explore the most common learning strategies employed by students in EMI classrooms and (2) to analyze the factors that influence students' selection of strategies. A total of forty students were involved in the focus groups interviews as part of the qualitative methodology. It was found that the participants mainly utilized cognitive, language-focused, social, and affective strategies. However, few of them used metacognitive strategies. In addition, it was also discovered that language barriers, content-related factors, the influence of tests and assessments, and anxieties remarkedly influenced students' choices of strategies. These findings deepen our understanding of the connections between factors and learning strategies and how they impact EMI students' educational experiences. Based on the results and discussions, several pedagogical implications can be drawn for the curriculum and classroom practices as follows.

- Instructors should enhance technological integration in their classes since students heavily rely on online resources and applications to supplement their learning. The instructors can provide or suggest educational applications, websites, and platforms that suit the specific needs of students in each discipline.
- Language barriers pose significant factors for students in EMI programs. Institutes or instructors, therefore, should offer language support programs based on students' needs, including vocabulary-building activities, language immersion opportunities, and additional language courses. Proficiency in English can enhance students' confidence to use language in the classroom.
- Since many students prefer reviewing their learning materials, instructors should provide materials beforehand to help students prepare for their class. Furthermore, extra reading lists can be offered to help students explore the topics discussed in class in-depth.
- The limited use of metacognitive strategies indicates a lack of recognition and comprehension among students of these strategies. Instructors should provide students with opportunities to practice and reflect on their learning processes, helping them to utilize metacognitive skills, such as planning, monitoring, and assessing.
- Peer support plays a crucial role in both medical and engineering education. Instructors, thus, should create more opportunities for collaborative learning, such as group discussions or peer tutoring programs. In particular, instructors should effectively build a supportive and positive classroom atmosphere to motivate students to seek help from teachers and ensure they feel at ease when asking questions in class.

In terms of limitations, since the study was conducted at a single university in Thailand, this may hinder the generalization of the findings, and the study involved forty participants. This small sample size may not fully reflect the diverse perspectives and experiences of the student population. It is recommended for further research to recruit more participants or adopt a mixed methods approach by integrating quantitative analysis from surveys or academic performance assessments, alongside qualitative methods. This combination could offer a more comprehensive understanding of students' learning strategies in EMI courses. In addition, future studies could explore the effectiveness of specific learning strategies, assess how these strategies influence academic achievement, and investigate the application of technology-enhanced learning in EMI settings. These examinations would offer practical insights for EMI lecturers as well as curriculum designers to enrich the learning experiences of their students.

Acknowledgements

This project received funding from (i) Suranaree University of Technology (SUT), (ii) Thailand Science Research and Innovation (TSRI), and (iii) National Science, Research and Innovation Fund (NSRF) under NRIIS number 179263.

References

[1] Ali, H. I. H. (2020). Lecture comprehension difficulties experienced by Omani students in an English-medium engineering programme. *Cogent Arts & Humanities*, *7*(1), 1741986. https://doi.org/10.1080/23311983.2020.1741986

[2] Bälter, O., Kann, V., Mutimukwe, C., & Malmström, H. (2023). English-medium instruction and impact on academic performance: a randomized control study. *Applied Linguistics Review*. https://doi.org/10.1515/applirev-2022-0093

[3] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101 https://doi.org/10.1191/1478088706qp063oa

[4] Corrales, K. A., Rey, L. A. P., & Escamilla, N. S. (2016). Is EMI enough? Perceptions from university professors and students. *Latin American Journal of Content & Language Integrated Learning*, *9*(2). https://doi.org/10.5294/laclil.2016.9.2.4

[5] Cummins, J. (2008). Teaching for transfer: Challenging the two solitudes assumption in bilingual education. *Encyclopedia of language and education*, *5*, 65-75. https://doi.org/10.1007/978-0-387-30424-3_116

[6] Dafouz, E., & Camacho-Miñano, M. M. (2016). Exploring the impact of English-medium instruction on university student academic achievement: The case of accounting. *English for Specific Purposes*, *44*, 57-67. https://doi.org/10.1016/j.esp.2016.06.001.

[7] Dearden, J. (2014). *English as a medium of instruction-a growing global phenomenon*. British Council.

[8] Dearden, J., & Macaro, E. (2016). Higher education teachers' attitudes towards English medium instruction: A three-country comparison. *Studies in second language learning and teaching*, *6*(3), 455-486. https://doi.org/10.14746/ssllt.2016.6.3.5
[9] Hengsadeekul, C., Koul, R., & Kaewkuekool, S. (2014). Motivational orientation and preference for English-medium programs in Thailand. *International Journal of Educational Research*, *66*, 35-44. https://doi.org/10.1016/j.ijer.2014.02.001
[10] Kym, I., & Kym, M. H. (2014). Students' perceptions of EMI in higher education in Korea. *The Journal of Asia TEFL*, *11*(2), 35-61.
[11] Le, H. T. T. (2023). The Impacts of Foreign Language Anxiety on Students in English-Medium Instruction Classes in the Central Region Universities, Vietnam. *Vietnam Journal of Education*, 103-113. https://doi.org/10.52296/vje.2023.265
[12] Li, N., & Wu, J. (2018). Exploring assessment for learning practices in the EMI classroom in the context of Taiwanese higher education. *Language Education & Assessment*, *1*(1), 28-44. https://doi.org/10.29140/lea.v1n1.46
[13] Macaro, E. (2018). *English medium instruction.* Oxford University Press.
[14] Macaro, E., Curle, S., Pun, J., An, J., & Dearden, J. (2018). A systematic review of English medium instruction in higher education. *Language teaching*, *51*(1), 36-76. https://doi.org/10.1017/S0261444817000350
[15] Mao, Y., & Peng, J. E. (2024). Exploring Chinese University Students' Learning Strategy Use in English-Medium Instruction Courses. *The Asia-Pacific Education Researcher*, *33*(1), 209-218. https://doi.org/10.1007/s40299-023-00720-6
[16] Muttaqin, S., & Chuang, H. H. (2022). Learning expectations, challenges, and strategies of university students on English-medium instruction. *Journal on English as a Foreign Language*, *12*(2), 272-294. https://doi.org/10.23971/jefl.v12i2.4041
[17] O'Malley, J. M., & Chamot, A. U. (1990). *Learning strategies in second language acquisition.* Cambridge University Press. https://doi.org/10.1017/CBO9781139524490
[18] Oxford, R. L. (1990). *Language learning strategies: What every teacher should know*. Heinle & Heinle Publishers.
[19] Phuong, Y. H., & Nguyen, T. T. (2019). Students' Perceptions towards the Benefits and Drawbacks of EMI Classes. *English Language Teaching*, *12*(5), 88-100. https://doi.org/10.5539/elt.v12n5p88
[20] Rose, H., Curle, S., Aizawa, I., & Thompson, G. (2019). What drives success in English medium taught courses? The interplay between language proficiency, academic skills, and motivation. *Studies in Higher Education*, *45*(11), 2149-2161. https://doi.org/10.1080/03075079.2019.1590690
[21] Rose, H., McKinley, J., Xu, X., & Zhou, S. (2020). Investigating policy and implementation of English medium instruction in higher education institutions in China. *British Council*.
[22] Rubin, J. (1987). Learner Strategies: Theoretical Assumptions, Research History and Typology. In A. Wenden, & J. Rubin (Eds.), *Learner Strategies in Language Learning* (pp. 15-30). Prentice Hall International Ltd.
[23] Shi, H. (2017). Learning strategies and classification in education. *Institute for Learning Styles Journal*, *1*(1), 24-36.
[24] Soruç, A., & Griffiths, C. (2018). English as a medium of instruction: Students' strategies. *Elt Journal*, *72*(1), 38-48. https://doi.org/10.1093/elt/ccx017
[25] Su, P., & Kong, J. (2023). Implementing EMI in Chinese music classes: Students' perceived benefits and challenges. *Frontiers in Psychology*, *14*, 1086392. https://doi.org/10.3389/fpsyg.2023.1086392
[26] Tang, K. N. (2020). Challenges and Importance of Teaching English as a Medium of Instruction in Thailand International College. *Journal of English as an International Language*, *15*(2), 97-118. https://files.eric.ed.gov/fulltext/EJ1282858.pdf
[27] Thomas, D. R. (2003). A general inductive approach for qualitative data analysis. *American Journal of Evaluation*, *27*(2), 237-246. https://doi.org/10.1177/1098214005283748
[28] Vo, T. (2021). *The use of digital technologies in an English-medium instruction context: A case study of Vietnamese higher education teachers and students* (Doctoral dissertation, Open Access Te Herenga Waka-Victoria University of Wellington).
[29] Volchenkova, K. N. (2023). Studying challenges faced by international students enrolled in English Medium Instruction programs at Russian University. *Science for Education Today*, *13*(2), 192-209. https://doi.org/10.15293/2658-6762.2302.09
[30] Vygotsky, L. S. (1978). *Mind in Society.* Harvard University Press.
[31] Wilang, J. D. (2022). Specific Anxiety Situations and Coping Strategies in Full English Medium Instruction Engineering Programs. *International Journal of Engineering Pedagogy*, *12*(6). https://doi.org/10.3991/ijep.v12i6.33453
[32] Yıldız, M., Soruç, A., & Griffiths, C. (2017). Challenges and needs of students in the EMI (English as a medium of instruction) classroom. *Konin Language Studies*, *5*(4), 387-402. https://doi.org/10.30438/ksj.2017.5.4.1

Thanatcha Ngamchatturat was born in Thailand in 1993. She earned her B.Ed. degree in English (First Class Honors) from Silpakorn University, Thailand in 2017, and furthered her education by obtaining an M.Sc. in TESOL from the University of Edinburgh, United Kingdom in 2019. Currently, she serves as an English lecturer at the School of Foreign Languages at Suranaree University of Technology in Thailand. Her research interests encompass English language teaching, English medium instruction, bilingualism, material design, and technology-enhanced language learning. Her latest publication delved into the needs analysis, challenges, language use, and the design of EMI lesson plans within an engineering context.

She can be reached via email at t.ngamchat@sut.ac.th or through ORCID ID 0009-0009-6804-2681.

Thidaporn Jumpakate was born in Thailand in 1993. She is currently a Ph.D. student in Education, studying at Victoria University of Wellington (Wellington doctoral scholarship). She obtained a B.A. in English (Second Class Honors) from Khon Kaen University, Thailand in 2015 and an M.A. in Applied Linguistics in English Language Teaching from King Mongkut's University of Technology Thonburi, Thailand in 2017. She worked as an English lecturer at the School of Foreign Languages at Suranaree University of Technology from 2020 to 2021. Her research interests lie in English language teaching, internationalization, and intercultural communication competence.

She can be accessed at dadadathi@gmail.com or through ORCID ID 0000-0002-1695-033X.

Sirinthorn Seepho was born in Thailand in 1967. She holds a B.A. in French (First Class Honors) from Chiang Mai University, Thailand in 1989, an M.A. in Applied Linguistics (English for Science and Technology) from King Mongkut's Institute of Technology Thonburi, Thailand in 1994, and a PhD in Foreign Language Education from the University of Pittsburgh, United States of America in 2002. She is currently an English lecturer at the School of Foreign Languages, Suranaree University of Technology in Thailand. Her recent work explored the needs, challenges, language utilization, and development of English-medium instruction lesson plans specifically for the engineering context. Her research interests include English language teaching, English medium instruction, teacher training, curriculum design (CBI, CLIL, EMI, OBE), and qualitative inquiry.

She is available for contact via email at sirin@sut.ac.th or through ORCID ID 0000-0002-5048-5435.