

College Students' Perceptions of English-medium Instruction: A Survey in a Local Chinese University

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Abstract

With the internationalization and globalization of recent decades, English has increasingly become a medium of instruction at universities worldwide. This survey was conducted in a local Chinese university, and focused on college students' needs and satisfaction regarding content, instructors, and assessment. A mixed method was employed, combining quantitative data from a questionnaire and qualitative data from interviews. The quantitative data were analyzed in SPSS 26.0, and qualitative data were analyzed in NVivo 12 plus. The findings reveal that students generally have a positive attitude towards the needs, content, instructor, and assessment satisfaction in EMI programs, which increased steadily. There is no significant difference in students' perceptions by gender and self-proficiency, and perceptions of needs, instructor, content, and assessment satisfaction are closely correlated with the overall satisfaction. The study suggests that course design tailored students' practical needs and advanced teaching techniques are crucial for enhancing EMI courses. Feedback was limited in students' participation and class size. Gender differences tend to diminish in EMI university settings and English proficiency should be assessed effectively. Needs and satisfaction with content, instructor, and assessment are vital in the overall satisfaction. These insights contribute valuable recommendations for the effective implementation of EMI programs and propose avenues for further research.

Keywords: EMI, instructors, students, perceptions

1. Introduction

With globalization, English has increasingly been a lingua franca, facilitating international communication and gaining popularity over recent decades. English-medium Instruction (EMI) is applied in various fields. However, controversies surrounding the precise definition of EMI remain unresolved (Rose et al., 2023). Some scholars argue that EMI is still poorly defined and lacks consensus (Airey, 2016). Dearden (2014) defines EMI as using English to teach specialized subjects in countries where English is not the primary language, which is widely used. Despite the ambiguity surrounding its definition, EMI's application continues to expand. It is frequently used in academic subjects in countries where English is not the native language (Macaro, Curle, Pun, An, & Dearden, 2018). Universities aim to attract international students who are willing to pay higher tuition fees (Xu, Rose, McKinley, & Zhou, 2023). Traditionally, students preferred to study in English-speaking countries to receive a better education and improve their English proficiency, as English, being a lingua franca. However, many students face obstacles such as geographical distance, visa restrictions, and financial constraints, preventing them from studying in these countries. Therefore, students are increasingly opting for studies in non-English-speaking countries.

In EMI courses, students typically face more significant challenges than traditional courses, which can be attributed to a lack of language proficiency, culture-specific behaviors, and difficulty in understanding (Pun, Fu, & Cheung, 2024). Numerous researchers and scholars have conducted related studies to find practical solutions to help students improve their abilities. China has been advocating for EMI to align its higher education with developed nations and enhance its competitiveness (Lei & Hu, 2014). Universities have adopted EMI to enhance their prestige, improve their rankings, attract more international students, and boost graduates' job competitiveness (Pham et al., 2023). In addition, EMI has been conducted by local Chinese instructors. However the MOE has been encouraging universities to employ native language experts to conduct EMI courses, as is also common in international contexts (Kym & Kym, 2014; Tatzl, 2011).

Further empirical research is necessary to evaluate the effectiveness of EMI courses taught by non-native instructors in local universities and identify and validate critical factors contributing to achieving the objectives (Jablonkai & Hou, 2023). The formulated research questions are as follows:

- 1) What are college students' perceptions of their needs and satisfaction with content, instructors, and assessments towards the EMI course in a local university?
- 2) What are the differences in college students' perceptions of their needs and satisfaction with content, instructors, and assessments towards the EMI course based on gender and self-proficiency in a local university?
- 3) What are the correlations between college students' perceptions of their needs and satisfaction with content, instructors, and assessments towards the EMI course in a local university?

2. Theoretical Background

With the implementation of EMI in different contexts, EMI perception studies have been conducted worldwide, mainly in the countries where English is used as the second language. The EMI perception studies in Asia covered a lot of topics (Gilanyi, Gao, & Wang, 2023). Research topics in EMI perception studies cover perceptions of students and instructors, teacher development, cross-culture, comparative research of different regions, educational stages, and medium instructions (Macaro, 2018). For example, Iwaniec and Wang (2023) found that the strongest motivations for EMI students to study in English are improved future job prospects, international community exposure, and potential gains in content learning and language-specific vocabulary. Richards and Pun (2023) identified various types of EMI, offering a foundation for objectively and analyzing the characteristics of EMI in different contexts. Students and teachers' attitude towards EMI courses in tertiary education was explored (Byun et al., 2011). Ahn (2023) revealed that many students experienced stress and were unsure how to address the problems they encountered in EMI courses using effective learning strategies. Besides, Floris (2014) conducted a survey on the EMI views of teachers and students in a large Indonesian college. They revealed the important role of English and many problems with EMI implementation. Zhang and Pladevall-Ballester (2022) reported that while students were generally positive about different EMI disciplinary courses, their attitudes worsened by the end of the semester. Zhang (2023) found that content satisfaction significantly affected overall satisfaction, while instructors played a crucial role in perceived improvement towards the writing EMI course. Macaro and Akincioglu (2018) found there was no significant difference of EMI perceptions in terms of year, university type and gender in a Turkish university.

There are also numerous empirical studies on EMI perceptions that explore the influencing factors. For example, Le and Nguyen (2023) examined how motivation and engagement affected satisfaction in EMI courses, finding that cognitive and emotional engagement mediated the relationship between motivation and student satisfaction. Zhang, Zhu, and Hu (2023) highlighted the importance of fostering self-efficacy among individuals to enhance job satisfaction and reduce burnout. Additionally, while language proficiency was related to job satisfaction, educational and workplace environments should consider multiple support dimensions. Jiang, Zhang, and May (2019) also pointed that educational context affected directly students' English learning motivation and needs. They also stressed collaboration between subject and language experts, because the ineffectiveness of instructors. A Korean study noted the use of Korean as a supplement in EMI courses (Byun et al., 2011). Tsui (2023) pointed out that EMI teacher development had not kept pace with the EMI course development. Systematic training and support are essential for EMI teachers to enhance their teaching effectiveness and address the diverse learning needs of students across various subjects (Macaro & Han, 2020). Reflective practice also benefited instructors' professional growth (Farrell, 2023). EMI instructors faced significant challenges related to English proficiency, and the appropriate level of proficiency required to become an EMI instructor was also complex (Macaro et al., 2018). Additionally, there was a need for a more structured and rigorous approach to both language and methodology training, as effective teaching methods were crucial for enhancing instructional quality.

Meanwhile, Xie and Curle (2022) found that students succeeded in EMI by acquiring content knowledge, improving English proficiency, applying and transforming knowledge, and developing new ways of thinking. In addition, some cognitive factors are considered. For example, the type of motivation affected language proficiency, which in turn predicted the academic success of EMI students in their studies (Soruç, Pawlak, Yuksel, & Horzum, 2022). Wilang and Nupong (2022) used exploratory factor analysis to explore factors affecting the students' EMI attitudes. Regarding learning outcomes, students' vocabulary range, writing skills, and teaching methods were identified as critical factors that significantly influence their level of lesson comprehension (Tran, Tran, & Bien, 2020). Yuan, Zhang, and Li (2023) revealed one core theme of the ideal EMI class, which was with a process-oriented course design permeated with a translanguaging approach. The EMI course design should focus on the learning process and allowed the use of multiple languages to enhance understanding and communication. Curle et.al. (2020) concluded four influential factors of EMI, summarized in Figure 1 below.

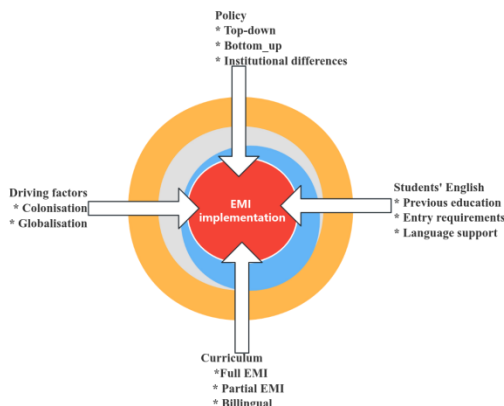


Figure 1. Factors influencing EMI implementation (adapted from Curle et al., 2020)

Theoretical and empirical studies on EMI perception in Chinese universities have been conducted. Jablonkai and Hou (2023) concluded that there was a general lack of empirical research in a local Chinese higher education. EMI has been implemented in some of the top universities, where students generally have a strong foundation in English. However, in many local universities, most students do not possess high levels of English proficiency. In China, improving local universities’ competitiveness and international quality. As EMI continues to spread, an increasing number of local universities are adopting EMI courses through various methods. Therefore, it is essential to conduct empirical studies to explore the effects of EMI taught by non-native instructors in a local university. With sufficient empirical data, it is easier to develop effective strategies to address practical challenges, highlighting the need for more comprehensive studies that explore the nuances of EMI implementation in various contexts.

3. Methodology

The study adopted a mixed methods design (Creswell & Clark, 2018), for which quantitative data were collected through a revised questionnaire, as referred to by Özer (2021), and qualitative data was collected through interviews with students and instructors. This study primarily focuses on quantitative data for its conclusions, while qualitative data provides supplementary insights. The study was conducted in a local Chinese university with EMI experience during the second semester of the 2023-2024 academic year. The research university was located in Luoyang City, Henan Province, China. A total of 420 students with EMI experience were randomly selected to participate in the questionnaire. Additionally, 16 students and eight instructors with EMI teaching experience were chosen for in-depth interviews.

As part of the quantitative research, potential participants were approached via email, phone call, and messaging from September 11 to September 15. Of the 420 questionnaires, 396 were included in the data collection after excluding incomplete and incorrectly filled surveys, resulting in a 94.3% return rate. To further explore students’ needs and satisfaction with content, instructors, and assessment, a post-survey questionnaire was sent to the 396 participants during Week 15, from December 11 to December 15. Finally, 384 questionnaires were included in the analysis due to the exclusion of seven invalid questionnaires, three students dropping out of the class to join the army, and two students not replying, resulting in a 97.0% return rate. Because student IDs were marked in the questionnaire to match participants in the pre- and post-study, this ultimately ensures the validity of the participation data. In the end, there were 384 valid data in the study. When comparing with the valid post-data, any invalid pre-data was deleted. In contrast, the remaining valid data from the pre-pilot study was retained, ensuring that the pre and post-participants were identical. So, finally, in paired sample tests, the number of participants is 384. Table 1 presents the basic information of the participants in the questionnaire.

Table 1. Participant demographics for post-survey (N=384)

Factor	Category	N	Percent (%)
Gender	Male	154	40.1
	Female	230	59.9
Self-evaluation	Novice	57	14.8
	Intermediate-low	228	59.4
	Intermediate-mid	60	15.6
	Intermediate-high	21	5.5
	Advanced-low	18	4.7

As for qualitative data, interviews were conducted, and each interview lasted between 30 and 45 minutes. After being

introduced to the purpose and essential details of the study to ensure a complete understanding of the interview, the interviewees generally expressed positive attitudes. A confidentiality agreement was also signed to protect their privacy before the formal interviews. The interviews were recorded, firstly transcribed into Chinese and then translated into English by the researchers. The translated text was checked by the researchers twice, word by word. Table 2 below shows the information of interviewed students (students named PS1 to PS16 for the purpose of anonymity), and Table 3 presents the instructors' information (instructors named PI1 to PI8 for the purpose of anonymity).

Table 2. Description for interviewees (Students)

Code.	Gender	Major	Year	EMI classes	Self-proficiency
PS1	F	Business Administration	2	6	Advanced-low
PS2	F	Food Science & Engineering	2	6	Intermediate-high
PS3	M	Animal Science	2	6	Intermediate-mid
PS4	F	Business Administration	2	6	Intermediate-mid
PS5	M	Environmental Science	2	6	Intermediate-mid
PS6	M	Animal Science	2	6	Intermediate-low
PS7	M	Food Science & Engineering	2	6	Intermediate-low
PS8	M	Environmental Science	2	6	Intermediate-low
PS9	F	Food Science & Engineering	2	6	Intermediate-low
PS10	F	Animal Science	2	6	Intermediate-low
PS11	F	Business Administration	2	6	Intermediate-low
PS12	F	Business Administration	2	6	Intermediate-low
PS13	M	Environmental Science	2	6	Intermediate-low
PS14	F	Food Science & Engineering	2	6	Intermediate-low
PS15	M	Animal Science	2	6	Intermediate-low
PS16	F	Environmental Science	2	6	Novice

According to Table 2 above, there were nine females and seven males, all of whom were sophomores. They had completed six EMI classes, including the current semester, which marked their third semester. In terms of self-proficiency, one student rated her proficiency as advanced-low, one as intermediate-high, three as intermediate-mid, nine as intermediate-low, and two as novice.

Table 3. Description for Interviewees (Instructors)

Code.	Gender	Major	Highest degree	Position	EMI classes
PI1	F	Literature	MA	Instructor	4
PI2	F	Education & International Economic & Trade	MED & MBA	Instructor	6
PI3	F	Education	MED	Instructor	3
PI4	F	Translation	MA	Assistant instructor	3
PI5	M	Translation	MA	Assistant instructor	2
PI6	F	Literature	Ph.D.	Professor	8
PI7	M	Linguistics	MA	Associate professor	7
PI8	M	Linguistics	Ph.D.	Professor	9

As shown in Table 3, there are five female and three male instructors. Two instructors majored in English literature, two in English linguistics, two in English translation, one in English education, and one in English education with a degree in international economic and trade. In terms of position, there are three instructors, two assistant instructors, one associate professor, and two professors. Four instructors are from the Department of Foreign Languages, and four are from the Department of International Education. The number of EMI courses taught, including the current semester, varies among them, ranging from two to nine.

After data collection, quantitative data were analyzed using SPSS 26. PCA was used to identify the factors, and the maximum possible variance was inferred using orthogonal rotations. Four factors were finally identified, including needs, satisfaction of content, instructor and assessment. The questionnaire structure is as shown in Table 4 below. Bartlett's test was significant ($p < .001$), and Kaiser-Meyer-Olkin measure of sampling adequacy was high (KMO= .927), indicating it was acceptable to proceed with the factor analysis. The Cronbach's alphas were individually .831, .915, .897, and .903, indicating that the questionnaire had high internal consistency.

Table 4. Structure for Questionnaire

Part	Factor	Item	No.
1	Basic information	Gender/ major/Self-proficiency	4
		Needs	5
		Content satisfaction	6
		Instructor satisfaction	7
2	Subcategories	Assessment satisfaction	6
		Overall satisfaction	1
Totally			29

The qualitative data was conceptualized, categorized, and summarized from the bottom-up to complete the coding classification of students’ and instructors’ perceptions. The researchers began coding with qualitative data analysis by NVivo12 plus. For reliability, the researchers coded the data three times and then compared the coded results, analyzing the results to reach consensus and attain the accuracy.

4. Results and Discussions

4.1 Students’ Perceptions of Needs and Satisfaction of Content, Instructor, and Assessment Towards the EMI Course

Table 4. Descriptive results

Factor	Pre-M (95% CI)	Post-M (95% CI)
Needs	3.178 (3.084~3.271)	3.827 (3.746~3.907)
Content satisfaction	3.168 (3.071~3.265)	3.772(3.681~3.864)
Instructor satisfaction	3.294 (3.209~3.380)	3.768(3.682~3.855)
Assessment satisfaction	3.314 (3.224~3.403)	3.650(3.565~3.734)

According to the means and 95% CIs in Table 4, the means are higher than the neutral, and there is no overlapping part between pre- and post-survey, which indicates that students’ perceptions of needs and satisfaction with content, instructor, and assessment are generally positive and their perceptions increase after taking the EMI course. EMI can help students improve language proficiency (Iwaniec & Wang, 2023), which confirmed by the interview data. PS12 confirmed the statement as follows:

Through various learning activities such as listening, speaking, reading, and writing, I can exercise my English skills and continuously improve my language proficiency. This learning environment helps me to master the language knowledge in English better and apply it more confidently in practical communication. (PS12, interview)

It is consistent with Curdt-Christiansen, Gao, and Sun (2023), which revealed the necessity of EMI. EMI can help students master professional knowledge and improve their English language skills. Although participants generally hold positive attitudes, many challenges are also proposed, particularly regarding language issues and new concepts. For example, PS2 and PI6 stated their opinions:

This course involves a large number of new vocabulary and terminology, which may have specific meanings and usage in English. Understanding and mastering these vocabulary and terminology may require more time and effort. (PS2, interview)

Good language skills can help students communicate and collaborate better with their international counterparts. (PI6, interview)

Course design is considered in EMI implementation to balance content and language proficiency and solve other challenges caused by poor English proficiency. All the instructors and students are non-native speakers, and they express concerns about their language proficiency, which will lead to inefficiencies in the classroom and occasionally distort the understanding. EMI course design should use learn-centered approach and focus on students’ needs. Obviously, students’ practical needs should be considered, which echoed Yuan, Zhang, and Li’s findings (2023). They proposed integrating content, language, and learning strategies. In EMI courses, students can use effective strategies to overcome challenges, which instructors must consider in course design.

As for instructor satisfaction, instructors play a vital role in EMI teaching and need to improve their professional development and teaching effectiveness continuously, including professionalism and competence to support students’ academic and personal growth. Students speak highly of their instructors, noting their solid English proficiency, professional knowledge, and teaching skills. PS1 majoring in Business Administration stated as follows:

English proficiency is relatively high and spoken language is also quite standard, allowing us to understand and comprehend them well. (PS1, Interview)

Kym and Kym (2014) revealed that students’ instructor satisfaction perceptions were related to the instructor’s native language, background knowledge, and study-abroad experiences. Except professional knowledge, teaching proficiency is also essential in EMI courses. Students focus on the understanding through teaching. Teaching proficiency is vital, especially today, with advanced technology. New advanced technology tools can promote students’ active and reflective learning. P15 once stated as follows:

The importance of English language teaching methods is gradually becoming more prominent.Teaching is constantly evolving and changing, and teachers must constantly learn and update their knowledge to keep pace with developments. We have been trying and exploring more effective teaching methods to help students better master knowledge and skills. (P16, interview)

Assessment satisfaction also increases and is generally positive. Assessment encompasses periodic evaluation and continuous feedback and is a foundation for identifying effective practices in EMI courses (Kao & Tsou, 2017). Students can improve their learning from instructors’ assessment and instructors can adjust their teaching from students’ assessment. Empirical studies reveal that feedback positively affects on students’ language use and knowledge (Mackey & Goo, 2007). In this interview, instructors recognized the importance of feedback, and the feedback was limited in students’ participation and class size (Li & Wu, 2018). As PS16 pointed the effect of feedback.

My supervisor will provide detailed feedback on the assignments, papers, or reports I submit, pointing out my shortcomings in terms of content and providing suggestions to improve my understanding and expression skills. This will help me better understand the course content and improve my expression skills. (PS16, interview)

4.2 Differences in Students’ Perceptions of Needs and Satisfaction of Content, Instructor, and Assessment Towards the EMI Course by Gender And Self-Proficiency

Table 5. Paired sample *t*-test results by gender

Factor	Gender	Test	N	Mean	SD	SE	<i>t</i>	<i>p</i>
Needs	M	Pre	156	3.236	.882	.071	.985	.325
	F	Pre	240	3.140	.986	.064		
	M	Post	153	3.779	.826	.067	-.944	.346
	F	Post	231	3.858	.786	.052		
Content satisfaction	M	Pre	156	3.215	.971	.078	.763	.446
	F	Pre	240	3.138	.993	.064		
	M	Post	153	3.747	.925	.075	-.434	.664
	F	Post	231	3.789	.904	.059		
Instructor satisfaction	M	Pre	156	3.352	.861	.069	1.069	.286
	F	Pre	240	3.257	.867	.056		
	M	Post	153	3.720	.904	.073	-.895	.371
	F	Post	231	3.800	.832	.055		
Assessment satisfaction	M	Pre	156	3.387	.906	.073	1.301	.194
	F	Pre	240	3.266	.900	.058		
	M	Post	153	3.630	.871	.070	-.380	.704
	F	Post	231	3.663	.825	.054		

Table 5 above shows *p*-values above .05, indicating no statistically significant differences in students’ perceptions of needs, content satisfaction, instructor satisfaction, and assessment satisfaction based on gender. This suggests that male and female students had similar experiences and levels of satisfaction with the EMI course, regardless of gender. These findings are consistent with Lasagabaster’s (2016) results, which also found that gender differences tend to diminish in EMI university settings. While Macaro and Akincioglu (2018) found no significant difference of students’ EMI perceptions in terms of gender. This maybe reflect a broader trend of decreasing gender disparities in educational contexts. Such insights could inform curriculum development and teaching practices, emphasizing the importance of focusing on factors beyond gender that influence student perceptions.

Table 6. Paired sample *t*-test results by self-proficiency

Factor	Self-proficiency	Test	Mean	SD	SE	F	<i>p</i>
Needs	Novice (N=60)	Pre	3.187	.963	.124	.896	.467
	Intermediate-low (N=234)	Pre	3.177	.966	.063		
	Intermediate-mid (N=62)	Pre	3.316	.821	.104		
	Intermediate-high (N=22)	Pre	2.927	1.019	.217		
	Advanced-low (N=18)	Pre	2.989	.969	.228		
	Novice (N=57)	Post	3.775	.776	.103	1.117	.348
	Intermediate-low (N=228)	Post	3.825	.811	.054		
	Intermediate-mid (N=60)	Post	3.730	.753	.097		
	Intermediate-high (N=21)	Post	4.076	.891	.194		
	Advanced-low (N=18)	Post	4.044	.813	.192		
Content satisfaction	Novice (N=60)	Pre	3.217	1.035	.134	.726	.575
	Intermediate-low (N=234)	Pre	3.132	.969	.064		
	Intermediate-mid (N=62)	Pre	3.239	.989	.126		
	Intermediate-high (N=22)	Pre	2.992	1.086	.231		
	Advanced-low (N=18)	Pre	3.444	.874	.206		
	Novice (N=57)	Post	3.702	.935	.124	.711	.585
	Intermediate-low (N=228)	Post	3.812	.900	.060		
	Intermediate-mid (N=60)	Post	3.706	.926	.120		
	Intermediate-high (N=21)	Post	3.921	1.023	.223		
	Advanced-low (N=18)	Post	3.537	.837	.197		
Instructor satisfaction	Novice (N=60)	Pre	3.545	.852	.110	1.565	.183
	Intermediate-low (N=234)	Pre	3.257	.888	.058		
	Intermediate-mid (N=62)	Pre	3.228	.759	.096		
	Intermediate-high (N=22)	Pre	3.182	.941	.201		
	Advanced-low (N=18)	Pre	3.302	.781	.184		
	Novice (N=57)	Post	3.531	.839	.111	1.372	.243
	Intermediate-low (N=228)	Post	3.795	.882	.058		
	Intermediate-mid (N=60)	Post	3.838	.764	.099		
	Intermediate-high (N=21)	Post	3.905	.976	.213		
	Advanced-low (N=18)	Post	3.786	.787	.186		
Assessment satisfaction	Novice (N=60)	Pre	3.414	.850	.110	.411	.800
	Intermediate-low (N=234)	Pre	3.298	.915	.060		
	Intermediate-mid (N=62)	Pre	3.328	.938	.119		
	Intermediate-high (N=22)	Pre	3.326	.946	.202		
	Advanced-low (N=18)	Pre	3.120	.796	.188		
	Novice (N=57)	Post	3.544	.793	.105	.567	.687
	Intermediate-low (N=228)	Post	3.663	.845	.056		
	Intermediate-mid (N=60)	Post	3.617	.892	.115		
	Intermediate-high (N=21)	Post	3.706	.896	.195		
	Advanced-low (N=18)	Post	3.861	.763	.180		

Table 6 above indicates no statistically significant differences between the five self-proficiency groups. This suggests that self-proficiency is not a distinguishing factor in students' perceptions of needs, content satisfaction, instructor satisfaction, or assessment satisfaction. Students may be uncertain about their English proficiency levels, as they might not clearly understand the criteria used to assess language proficiency. This confusion could lead to inconsistencies in how they perceive and report their abilities, making self-proficiency an unreliable metric for distinguishing their perceptions of the EMI course. This finding highlights the potential limitations of using self-assessment as a measure of proficiency in research. It suggests the need for more objective and standardized language skill evaluation when analyzing student perceptions. Additionally, it underscores the importance of providing students with more explicit guidelines and criteria for assessing their proficiency. This could lead to more accurate self-evaluations and meaningful insights into their experiences with EMI courses.

4.3 Correlations of Students' Perceptions of Needs and Satisfaction of Content, Instructor, and, Assessment Towards the EMI Course

Table 7. Correlations for factors in pre-survey

Factor		Needs	Content satisfaction	Instructor satisfaction	Assessment satisfaction	Overall satisfaction
Needs	<i>r</i>	1				
	<i>p</i>					
Content satisfaction	<i>r</i>	.364**	1			
	<i>p</i>	.000				
Instructor satisfaction	<i>r</i>	.377**	.418**	1		
	<i>p</i>	.000	.000			
Assessment satisfaction	<i>r</i>	.344**	.363**	.488**	1	
	<i>p</i>	.000	.000	.000		
Overall satisfaction	<i>r</i>	.343**	.325**	.327**	.329**	1
	<i>p</i>	.000	.000	.000	.000	

Table 7 above shown regarding the correlation of all factors in pre-survey, *r* were all over .3. Pearson's correlations of $r \geq 0.5$ and $r \geq 0.2$ were considered evidence of convergent validity and concurrent/criterion validity, respectively (Ortega et al., 2023). Iversen and Gergen (2012) also stated that *r* between .30 ~ .70 showed positive a moderate correlation among factors. Therefore, there was a correlation between students' perceptions of needs, satisfaction with content, instructor, and assessment. The correlation between them was positive. One of them was higher, the other became higher. Considering the variables strongly connected, the moderate positive correlation may originate from the fact due to the similar feature of these variables and thus, the results in this study show a correlation. However, a correlation does not imply a causal link between the variables. In addition, hidden or intervening variables, such as motivation, attitudes, can be possible.

Pearson's correlations among the four factors were also explored in the post survey. The detailed correlations are listed in Table 6 below.

Table 8. Correlations for factors in post-survey

Factor		Needs	Content satisfaction	Instructor satisfaction	Assessment satisfaction	Overall satisfaction
Needs	<i>r</i>	1				
	<i>p</i>					
Content satisfaction	<i>r</i>	.398**	1			
	<i>p</i>	.000				
Instructor satisfaction	<i>r</i>	.404**	.435**	1		
	<i>p</i>	.000	.000			
Assessment satisfaction	<i>r</i>	.370**	.380**	.392**	1	
	<i>p</i>	.000	.000	.000		
Overall satisfaction	<i>r</i>	.335**	.353**	.326**	.387**	1
	<i>p</i>	.000	.000	.000	.000	

Table 8 above suggested a moderate positive correlation between students' perceptions of needs, satisfaction with content, instructor, and assessment in the post survey. One of them was higher, the other became higher. In the overall satisfaction towards the EMI course, perceptions of needs, satisfaction of content, instructor and assessment all play a crucial role, which should arouse the attention, which was consistent with Iwaniec and Wang (2023). In EMI courses, students' needs, satisfaction with content, instructors, and assessments are all closely correlated with overall satisfaction.

5. Conclusions

In this study, students' needs and satisfaction levels with content, instructor, and assessment towards the EMI course were explored. As for the first research question, students have a positive perception, and there is a significant increase among the four factors, echoing the findings of Zhang and Pladevall-Ballester (2022). It is worth noticing that course design should be tailored to meet students' practical needs (Yuan, Zhang, & Li, 2023). Professional development, especially teaching proficiency, through online teaching techniques, can facilitate interactions with teachers and peers (Reinders, 2012). Instructors also recognize the importance of feedback, and the feedback is limited in terms of students' participation and class size (Li & Wu, 2018). As for the second research question, there are no significant differences by

gender and self-proficiency. EMI may serve as a leveling ground where traditional gender biases in educational preferences exist (Macaro & Akincioglu, 2018). Self-proficiency does not significantly affect students' perceptions. Students may be unsure of their English proficiency levels because they often do not understand the assessment criteria. Students' English proficiency should be assessed effectively. As for the third research question, the overall satisfaction towards the EMI course, perceptions of needs, satisfaction with content, instructor, and assessment play a crucial role in the overall satisfaction, which was consistent with Iwaniec and Wang (2023). This suggests that students' overall satisfaction with the course significantly increases when they perceive the needs, content, instructor, and assessment satisfaction as relevant and engaging.

The study provides insight into the perception of EMI taught by non-native instructors in a local university and sheds some light on the methods of EMI curriculum design. Given the limited participation, research time, and the type of university, longitudinal studies and comparative studies across different regions and educational contexts to identify best practices are called for to examine resource allocation.

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Appendices

Qualitative results for interviewees (Students)

Selective Coding	Axial Coding	Open Coding	Coding Number	Total Number
Perceptions	EMI is necessary	EMI is beneficial	73	569
		Beneficial for future career or academic development	12	
		Better for job competitiveness	7	
		Internationalization	54	
	Content learning	Attitudes towards the content of EMI	26	
		Course design	35	
		Additional materials or resources	44	
		Content usage	17	
	Instructors are professional	Attitudes towards of instructors' professionalism	25	
		Effective teaching methods	64	
		Attitudes towards teaching methods	4	
		Positive classroom atmosphere	26	
		Negative classroom atmosphere	10	
	Assessment	Attitudes towards assessment	22	
		Attitude towards final exam	23	
		Limitations of final exam	7	

Qualitative results for interviewees (Instructors)

Selective Coding	Axial Coding	Open Coding	Coding Number	Total Number
Perceptions	EMI is necessary	Attitudes towards EMI	35	625
		Beneficial for future career or academic development	28	
		Better for job competitiveness	10	
		Internationalization	17	
	Essential needs or skills for students	Students needs or skills are essential	42	
		Communicative needs	20	
		Good English proficiency	32	
		Professional ability	25	
		Self-learning ability	20	
	Content learning	Clarity and consistency in teaching	28	
		Classroom interaction and engagement	12	
		Teaching in English better than in Chinese	5	
	Necessary qualities for Instructors	Percentage taught in English	9	
		Professional qualities for EMI instructors	67	
		Improve instructors' EMI teaching proficiency	15	
		Assess students' English proficiency	63	
	Instructional techniques	Cross-cultural quality	4	
		Using offline tools	43	
		Using online tools	38	
	Assessment	Using blended tools	55	
Effective assessment		17		
Assessment method are controversial		11		
Instructors' feedback		23		
	Attitudes towards final exam	6		