



Investigating problem-solving and critical-thinking skills among EFL postgraduate students in northern Thailand

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ABSTRACT

This research employs a mixed-methods design to investigate postgraduate EFL students' critical-thinking and problem-solving skills. Through purposive sampling, 54 Thai and international participants (between 23-25 years old with 29 females and 25 males) from three universities were selected. Quantitative data, collected through bilingual questionnaires (paper-based and online through Google form) and analyzed through descriptive statistics and *t*-test analysis, assessing problem-solving and critical thinking skills, revealed high proficiency among participants, with variations in creative problem-solving. Qualitative data from semi-structured interviews (face-to-face and online through MSteam) through thematic analysis highlighted the significance of open communication, trust, and encouragement in supporting students' academic endeavors. Challenges such as methodological obstacles and group disagreements highlighted the need for adaptability, critical-thinking, and collaborative problem-solving. Cultural and linguistic influences emerged as substantial factors impacting problem-solving approaches. The data integration emphasized the significance of skill development and the interconnectedness of language, culture, and academic performance. The discussion delves into the implications of tailored interventions, emphasizing the crucial role of supervision and cultural sensitivity. This study contributes to the broader discourse on EFL postgraduate education, shedding light on the intricate dynamics of skill development and fostering a call for further exploration and discussion within the academic community.

KEYWORDS

problem-solving, critical-thinking, EFL students, mixed-methods approach, supervision, skill development

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INTRODUCTION

Thailand's education experts know that fixing problems and thinking clearly must be done well. This is important for those seeking education beyond school. Getting these higher-level thinking skills is challenging for Thai people learning English. One of the most complicated tasks is reading and analyzing complex text. It's difficult for university students to fix problems and think through ideas (Ploysangwal, 2018). Recent research by Namsaeng and Sukying (2021) shows that when people read together, they improve their thinking skills. They do this by talking about the problems they discuss. However, Boonsathirakul and Kerdsonboon (2021) found that these brain skills are often missing among students at the college level, especially in classroom settings. Srirak (2023) noted that teachers and students love learning these brain skills but find blending them into their lessons rugged.

Thampi et al. (2024) say that what is expected of these adult Thai learners is challenging, mainly if they are not good with language or did not grow up with much higher-level thinking. Nguyen (2025) adds that writing at the university level is challenging, especially for adult learners, since they do not know how to organize their ideas effectively into a structured argument. Even more difficult, Wu and Buripakdi (2022) explained that writing a thesis paper can be tricky. Understanding problems and thinking are key to this. Rungsawang and Pookcharoen (2022) suggested an answer to these challenges: using technology and new teaching styles. Yet, there are still some barriers. Many students in Northern Thailand cannot access useful academic tools and lack the guidance to build these key skills.

Some researchers have studied how well Thai students think. These include Ploysangwal (2018), Namsaeng and Sukying (2021), and Boonsathirakul and Kerdsomboon (2021). Ploysangwal (2018) studied the idea of giving students reading tests, while Namsaeng and Sukying (2021) examined how reading as a group could help. Boonsathirakul and Kerdsomboon (2021) found that students at the university level vary a lot in their thinking skills. Facility-based blended learning proved efficient in teaching problem-solving skills to Thai future students, as Pimdee et al. (2024) reported, and Rattanachaihada et al. (2025) established scientific critical thinking practices for secondary education assessments. Wangmanee and Kaowiwattanukul (2024) stressed that contemplative methods effectively build EFL undergraduates' speaking and critical thinking skills. Multiple research studies confirm specific obstacles and benefits when nurturing critical thinking skills in Thai educational institutions, especially in EFL environments.

Postgraduate students in EFL programs experience distinct barriers due to their multicultural origins, so they need essential critical thinking and problem-solving skills to achieve academic excellence. According to Li & Ren (2020) and Yildirim and Ozkahraman (2011), students must evaluate complex information while questioning premises as they develop well-supported conclusions. The combination of information understanding organization and synthesis skills (Mayer, 1992) enables students to handle tasks that require analytical material assessment, argument construction, and research presentation. Multiple studies have shown that critical thinking positively correlates with working memory capacity, spatial cognition, and language proficiency abilities, according to Anjariyah et al. (2022) and Wulandari and Nurhayati (2018). Postgraduate TEFL students demonstrate different views about critical thinking according to studies highlighting the requirement for specialized training to embed these skills properly within curriculum structures (Afshar, 2019).

Educational demands require postgraduate students to develop robust skills in critical thinking and problem-solving abilities, according to Sari et al. (2022). Postgraduate EFL students need to build these competencies when preparing their thesis work because they need to combine data analysis with information integration and argument development. The research reveals that such students encounter obstacles in their academic writing and require specific guidance and support (Wu & Buripakdi, 2022). Azwati et al. (2022) argue that EFL learners require specialized training prototypes because research writing directly relates to critical thinking development. Combining classroom-based critical thinking instruction and creative thinking development leads EFL students to excel at perspective comprehension and innovative solution development (Vero & Puka, 2018; Vincent-Lancrin et al., 2019). Learning approaches that place students at the center and direct lessons represent the most efficient methods to develop these skills within higher education (Vincent-Lancrin et al., 2019). Their study with Iranian EFL students and Yousefi and Mohammadi (2016) on the

effects of gender and language proficiency on critical thinking demonstrated that critical thinking instruction improves reading comprehension proficiency.

Combining Mayer's problem-solving model with Ennis' view on critical thinking leads to a systematic problem-solving approach. This takes advantage of the two well-established ideas and tries to combine them. First, the problem is fully understood and analyzed with critical thinking, and then, solutions to the problem are developed and assessed using Mayer's methodology. This framework presents an integrated approach to training postgraduate students, including problem analysis, evaluation of possible solutions, and application. This strategy includes tailored exercises, contextual relevance, and teaching nursing to enhance problem-solving and critical thinking skills for real-world application in the academic context.

Despite the acknowledgment of problem-solving and critical thinking skills as necessary for successful Thai EFL postgraduate students, there is yet little understanding of how these skills can be developed and integrated further into Thai students' academic practices, particularly in the case of Thai EFL postgraduate students in Northern Thailand. Although studies like Ploysangwal (2018) and Namsaeng and Sukying (2021) highlight that there are problems with analytical reading and the effectiveness of collaborative learning, research, in general, lacks exploring the details of the difficulties faced by EFL postgraduate students when they are writing their thesis, namely to combine information and produce a coherent argument (Ho, 2024; Nguyen, 2025). Although technology integration (Rungsawang & Pookcharoen, 2022) and blended learning (Pimdee et al., 2024) appear to be innovative, they are not very effective because there are very few resources for the academic as well as lack of mentoring, especially in Northern Thailand. Also, Boonsathirakul and Kerdsomboon (2021) relate to the importance of critical thinking but do not mention its difference from region to region. It attempts to close a gap concerning difficulties faced by EFL postgraduate students in Northern Thailand, what their specific strengths and challenges are, and develops targeted interventions to enhance their problem-solving and critical thinking skills. However, it offers better EFL instruction, upholds international discourse standards, and encourages cooperation between Thai and international students to promote a safer, fairer, and more effective educational framework.

LITERATURE REVIEW

Critical thinking and problem-solving techniques have been thoroughly researched in academic settings. Well-known ideas include Mayer's four-component problem-solving model, Ennis' critical thinking theory, and Bloom's taxonomy. These theories explain the cognitive and affective processes that help guide teaching these skills. Though frequently used, few Thai studies have used Ennis' (1987) and Mayer's (1992) models. Their applicability has been demonstrated in recent literature, which is why this study's theoretical framework is based on them.

It is possible to improve critical thinking and problem-solving abilities by combining Ennis' theory with Mayer's model. The four processes in Mayer's approach are Encoding (developing an idea of the problem), integration (making a strategy), application (executing the plan), and automaticity (evaluating the plan's effectiveness). The main components of Ennis' theory include identifying presumptions, evaluating arguments, taking into account many points of view, and making deductions. These abilities are essential for solving problems. A comprehensive framework is produced by combining these theories. Whereas

Mayer's model formulates and assesses prospective solutions, Ennis' theory aids in identifying assumptions and evaluating arguments. This combination makes it possible to approach problem-solving thoroughly. While Ennis' theory analyzes and evaluates solutions, Mayer's model depicts and generates them. This integrated strategy guarantees a more efficient problem-solving procedure.

Mayer's paradigm includes problem formulation, implementation, assessment, and evaluation. Ennis' approach strongly emphasizes critical thinking's intellectual norms and attributes. For instance, precision in problem depiction is ensured by accuracy and clarity, while intellectual humility and perseverance foster open-mindedness and persistent effort. In contrast, academic norms like accuracy and completeness provide an impartial examination, relevance, and logic guarantee appropriate responses. Academic responsibility promotes continuous evaluation of efficacy, and clarity and feasibility guarantee that the answer is comprehended and achievable. A thorough framework for handling complex problems is provided by fusing Mayer's problem-solving model with Ennis' critical thinking theory, which improves decision-making and problem-solving abilities. The current study uses Mayer's problem-solving model and Ennis' critical thinking theory as their components naturally support each other. Mayer's model includes encoding, which helps students understand problems; integration, which creates solutions and applications that execute these solutions; and automaticity, which measures solution effectiveness. Ennis' theory focuses on identifying assumptions, argument evaluation, and the need for perspective exploration before making deductions. The core purposes of these two frameworks exist independently, but they touch on similar areas. The assessment of solutions ranks as an essential component shared by Mayer's model and Ennis's theory, although each handles this differentially by evaluation methods and ensuring logical soundness. Mayer's model Integration stage of forming strategy corresponds to Ennis' reasoning and argument evaluation because critical analysis is needed to refine strategies. Since problem-solving and critical thinking share natural interconnections, some overlapping elements are beneficial for achieving comprehensiveness of the theoretical framework.

Ultimately, this study tries to improve EFL training quality in Thailand, encourage international dialogue, and promote cooperation between Thai and international students. This research examines the critical thinking and problem-solving abilities of Thai and foreign postgraduate EFL students in northern Thailand. The study intends:

1. To evaluate the problem-solving and critical thinking skills level among EFL postgraduate students.
2. To identify the factors that impact the development of EFL postgraduate students' problem-solving and critical-thinking skills.
3. To evaluate the effectiveness of their current critical thinking and problem-solving level in drafting their proposal/thesis.

Research questions

This study aims to address the following research questions:

1. What are the current problem-solving and critical thinking levels among EFL postgraduate students?
2. What factors influence the development of problem-solving and critical-thinking skills among EFL postgraduate students?
3. How effective are EFL postgraduate students' problem-solving and critical thinking skills in drafting their thesis/proposal?

METHODOLOGY

The research design included quantitative and qualitative methods for data acquisition. The study separated postgraduate students into two groups: Thai and international students, including Chinese, Buthanese, Burmese, American, and Norwegians. Academic members from three leading Northern Thailand universities formed the participant sample selection base. Postgraduate education occurs in two Thai learning institutions, Chiang Mai and Chiang Rai, which are unrevealed names.

Participants

A Purposive sampling approach is used for this study as it allows the researchers to select participants most relevant to the research questions and facilitates an in-depth exploration of critical thinking and problem-solving in specific academic contexts (Creswell & Creswell, 2023). It is utilized to choose fifty-four participants for the study. This involved categorizing participants into two groups: Thai students and international students from various countries, including China (12), Bhutan (10), Myanmar (9), Norway (1), and the United States (4), and the rest were Thai nationals. Enrolling Thai and international students in postgraduate programs enables a more extensive representation because these programs commonly admit a limited number of students. Smaller research participant numbers become less restrictive through this method, generating in-depth knowledge about the study subject. The participants, master's students in TESOL and English for Professional Development, were selected from three universities in Northern Thailand, including two public and one private institution in Chiang Mai and Chiang Rai. The selection process included universities to ensure the investigation of critical thinking and problem-solving in appropriate academic environments. The research objective included students from Thailand and foreign nationals to examine cultural and linguistic effects on skill learning.

The professors/lecturers at the universities informed all parties about the research project before selecting suitable candidates for interview participation. The qualitative interview participation was accepted by eight respondents who asked for anonymity. The participants involved in the study belonged to an age bracket between 23 and 25 years. The survey included equal representation of masculine (4) and feminine (4) participants; two participants were Thai, and two were international, ensuring a balanced gender distribution. The participants were enrolled in their final year of postgraduate education, mainly in the third semester, which allowed researchers to obtain knowledge from mature students in their academic advancement.

Instruments

Quantitative data were collected by administering an online and paper-based questionnaire where participants were on campus during data collection. The questionnaire comprised three primary sections: one focused on gathering demographic information, section two aimed at assessing problem-solving (items 1-20), and the critical thinking questions are organized into four components based on Ennis's framework. Identifying Presumptions is addressed through four questions (Q1, Q2, Q3, Q4) that focus on recognizing biases, assumptions, and limitations in one's thinking. Evaluating Arguments is assessed by four

questions (Q5, Q6, Q7, Q8) that measure the ability to evaluate evidence, arguments, and the credibility of sources. Considering Multiple Perspectives is addressed by four questions (Q9, Q10, Q11, Q12) that evaluate openness to diverse viewpoints and interpretations. Finally, Making Deductions is covered by eight questions (Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20) that assess the ability to generate solutions, think creatively, and adapt strategies when faced with challenges.

Based on Mayer's framework, the problem-solving questions in the third section of the questionnaire address four distinct components. The encoding aspect is addressed through four questions assessing the test-takers' abilities to grasp essential information, identify faulty logic, and separate credible sources from unreliable ones (Q1, Q2, Q3, Q4). Questions for integration evaluation (Q5, Q6, Q7, Q8, Q9) analyze how students combine various perspectives while spotting prejudices and relating different concepts. The application process comprises six questions (Q10, Q11, Q12, Q13, Q14, Q15) that evaluate examinees' problem-solving strategies from different contexts through evaluation and application processes. The five questions (Q16, Q17, Q18, Q19, & Q20) evaluate automaticity by assessing efficiency, flexibility, and decision-making when solving problems. The questionnaire was made available in a bilingual Thai and English format and underwent a pilot test to ascertain its validity and reliability.

The researcher collected qualitative information through semi-structured interviews with specific respondents. The researcher started question development by following research goals and an extensive analysis of previous studies that determined which areas needed investigation. The researcher created initial open-ended questions (appendix 1) by considering the participants' perspectives and personal experiences. The interview uses a systematic order where loose questions lead to detailed exchanges. Probing questions are part of the interview plan to instigate participants to provide detailed explanations of their responses, thus revealing deeper information. A thorough examination of the last question set ensures that research objectives remain correctly implemented throughout the qualitative information collection process.

Reliability check

Before the research instrument was used in the main study, the pilot was carried out to assess postgraduate students' critical thinking and problem-solving skills, including 12 EFL graduate students. The initial version of the questionnaire had more items under each section (unevenly, between 23-31 items). After consulting some references, mainly (Dörnyei & Dewaele, 2022), the researcher decided to run the test first and then chose to reduce the number of items. After running the test and making some adjustments (mainly removing items with low reliability like 0.61 or 0.58) and rerunning the test one more time, the reliability of the questionnaire was shown by the strong internal consistency found in both sections of the questionnaire. Cronbach's alpha for Section 2, which assessed problem-solving skills, was 0.90, while Section 3, which assessed critical thinking, received a score of 0.89, indicating the instrument's reliability. Overall, the pilot research's high reliability and validity ratings and meticulous questionnaire refinement provide a solid basis for its use in the main study.

Table 1. Reliability (Cronbach’s Alpha)

Reliability Analysis	
Section	Cronbach’s Alpha
Section 1 (Items 1-20)	0.90
Section 2 (Items 21-40)	0.89

Validity check

An expert panel of 3 was consulted to assess the validity of the questionnaire. Each expert held a PhD and had over seven years of experience teaching at the graduate and postgraduate levels in diverse foreign contexts (1 from Malaysia, two from Thailand). They all had considerable knowledge in Teaching English to Speakers of Other Languages (TESOL). Additionally, these specialists were well-known in their area since they had been active contributors to academic literature and held editorial positions in prestigious academic publications for at least five years. The expert panel’s level of agreement about item relevance and alignment with the fundamental construct of problem-solving and critical thinking abilities was measured using the IOC. The IOC values ranging from -1 to +1 provided a numerical indicator of how well the expert assessments aligned with the planned construct. A more substantial expert consensus and more congruence with research goals are both indicated by higher IOC scores (Mach et al., 2017; Rusticus et al., 2018).

Table 2. Instrument Validation

IOC Validity Assessment		
Instrument	IOC value	Validity
Questionnaire	0.90	valid
Interview Questions	0.88	valid

Data collection and analysis

To gather data, participants spent around 15 minutes filling out a paper-based or online version of the questionnaire (google form) that included three sections: demographic data, critical thinking, and problem-solving skills. The reason two versions of the questionnaire were employed for data collection was that, at the time of data collection, some students were not on campus and were busy working on either their proposals or thesis, and some others were available on the campus either to attend a lecture or to meet up with their supervisors. Python, a flexible programming language, was used for data analysis, utilizing NumPy, Pandas, and Matplotlib, among other libraries, for data processing, descriptive statistics and *t*-test analysis, and visualization (Lucks, 2008; Perez et al., 2010).

Once the interviews and the transcriptions were done, the qualitative interview data were analyzed through reflexive thematic analysis (Familiarization with the Data, Generating Initial Codes, Searching for Themes, Reviewing Themes, Defining and Naming

Themes, and Producing the Report) (Braun & Clarke, 2006) to identify recurrent themes and patterns. Braun and Clarke's framework guided the discovery, improvement, and labeling of themes pertinent to organizing and assessing qualitative interview data for the thematic analysis. Ensuring the confidentiality of participating institutes during the study was deemed ethically necessary to sustain their engagement and ethical approval. Many strict steps were taken to give the qualitative research procedure credibility. First, member checking was used to verify the integrity and accuracy of the data presented, increasing the interpretations' validity. Peer debrief meetings were also held, wherein researchers discussed the analytical method, interpretations, and emergent themes. By offering a detailed account of the study process, this open documentation made decisions traceable and improved the reliability of the qualitative data.

RESULTS

The part is divided into three main sections and several subsections to address the research questions: 1) quantitative data analysis, 2) qualitative data analysis, and 3) integration of two data analyses.

Demographic information

All 54 students in the Master of English program from the participating universities were in their second and third years. According to the demographic results, 35.2% of the participants were male and 65.8% female. Furthermore, a wide range of countries are represented in the survey; of the participants, 22.2% were Thai (12 students), while 77.8% identified as international students, the international students were from various countries: 33% were from China (12 students), 28% from Bhutan (10 students), 25% from Myanmar (9 students), 3% from Norway (1 student), and 11% from the United States (4 students).

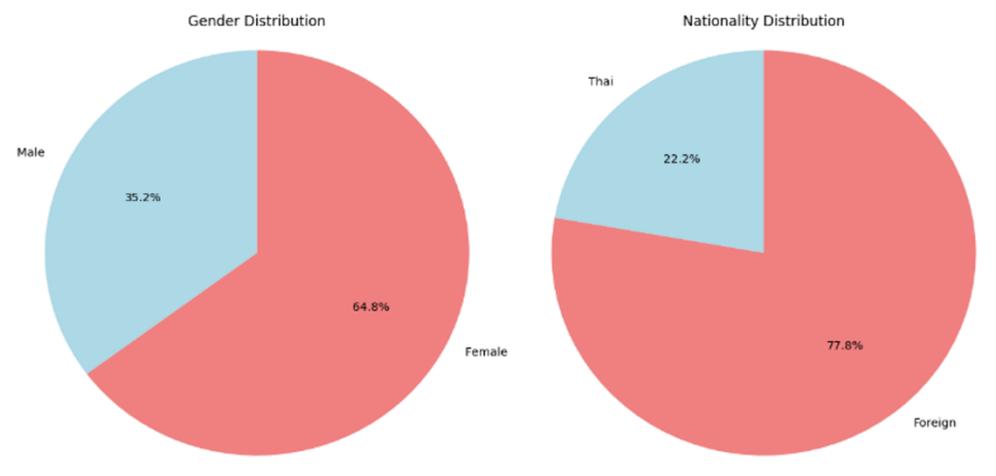


Figure 1. Critical-thinking Skills Results

With 54 observations per dimension in this dataset, the count (N) represents the total number of students. Mean scores (M) provide a thorough perspective by indicating the average performance across aspects.

Table 3. Critical-thinking Skill

Component	Question items	Std	Min	25%	Mean	75%
Identifying Presumptions	Q1 (Recognizing biases)	0.81	2.00	3.25	3.91	4.00
	Q2 (Reflecting on thinking processes)	0.69	3.00	4.00	4.11	5.00
	Q3 (Breaking free from preconceived ideas)	0.98	2.00	3.00	3.74	4.00
	Q4 (Recognizing experience limitations)	0.81	2.00	4.00	3.85	4.00
Evaluating Arguments	Q5 (Communicating ideas effectively)	0.72	2.00	3.25	3.93	4.00
	Q6 (Evaluating evidence and arguments)	0.69	2.00	3.00	3.70	4.00
	Q7 (Distinguishing reliable sources)	0.63	3.00	4.00	4.15	5.00
	Q8 (Evaluating the credibility of research claims)	0.75	3.00	3.25	4.04	5.00
Considering Multiple Perspectives	Q9 (Considering different perspectives)	0.71	2.00	4.00	4.20	5.00
	Q10 (Curiosity in finding research gaps)	0.72	2.00	4.00	4.11	5.00
	Q11 (Considering alternative explanations)	0.78	2.00	3.00	3.87	4.00
	Q12 (Creative thinking in problem-solving)	0.65	3.00	4.00	4.35	5.00
Making Deductions	Q13 (Seeing connections between ideas)	0.76	2.00	4.00	4.09	5.00
	Q14 (Generating multiple solutions)	0.78	2.00	3.00	3.67	4.00
	Q15 (Applying critical thinking to ethics)	0.68	3.00	4.00	4.19	5.00
	Q16 (Creative problem-solving beyond traditional uses)	0.92	1.00	3.00	3.91	5.00
	Q17 (Generating new solutions)	0.83	2.00	3.00	3.72	4.00
	Q18 (Overcoming mental blocks)	0.82	1.00	4.00	4.04	5.00
	Q19 (Generating innovative ideas)	0.76	2.00	3.00	3.74	4.00
	Q20 (Adapting strategies to unexpected challenges)	0.63	3.00	4.00	4.28	5.00

The study displayed its findings in Table 3 according to the four elements of critical thinking: Identifying Presumptions, Evaluating Arguments, Considering Multiple Perspectives, and Making Deductions. The survey includes particular assessment items to measure different components, starting with Q1–Q4 for identifying Assumptions and Q5–Q8 for evaluating arguments. It also includes tests for recognizing biases and evaluating evidence assessment. The mean score assessment shows that students gave their most substantial agreement to Q9 (Considering different perspectives) with 4.20 yet experienced difficulty with Q14 (Generating multiple solutions), reaching 3.67. The response variability can be measured through standard deviations where Q16 (Creative problem-solving) demonstrates 0.92. The items that require logical deduction (Q13, Q18) and analytical thinking (Q6, Q8) are directly linked to cognitive skills that create specific assessment criteria for students' critical thinking competencies. The report reveals that students show expertise in viewing matters from multiple perspectives (Q9 score 4.20) while struggling to create various solutions (Q14 level

3.67). The standard deviation for creative problem-solving (Q16) is 0.92, indicating that students show varying confidence levels and abilities in this area.

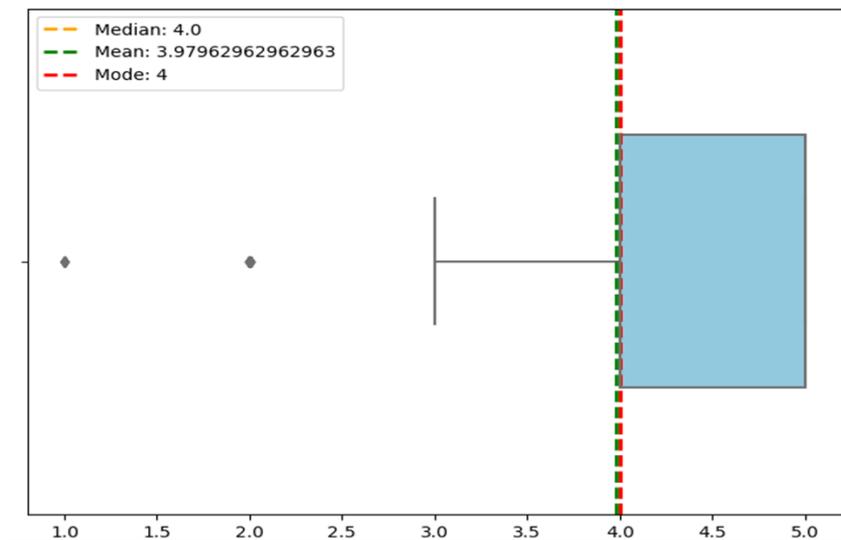


Figure 2. Critical-thinking Skills level

The study shows remarkable competency by analyzing the average scores as key performance indicators. These aspects cover a range of cognitive skills, such as logical deduction, innovative problem-solving, analytical thinking, and sound decision-making. Analytical thinking, for example, had exceptionally high mean scores (average of 4.20), demonstrating the students' strong ability to break down complex situations.

The findings show some variation in the scores despite the overall high competency. This variability indicates that, even if many students demonstrate high problem-solving and critical thinking abilities, there are some situations in which performance may differ. Interestingly, there was a noticeable variation in the creative problem-solving scores (from 3.70 to 4.19), suggesting that different people had different proficiency levels in this area. Comprehending these variances is essential to tailoring educational interventions that tackle these requirements and challenges encountered by students. There were also minor differences in the scores of students from diverse linguistic backgrounds, with international students scoring somewhat lower on average.

The following interpretation stage converts these results into practical suggestions for educators and legislators. For example, establishing focused workshops to improve skills in this dimension explicitly is prompted by recognizing the observed heterogeneity in creative problem-solving scores. Similarly, the inclusion of advanced analytical tasks in the curriculum may be influenced by the discovery of students who consistently get high results in critical thinking. Lastly, these findings highlight the necessity for a tailored approach to skill development in addition to confirming the usually high competency of EFL postgraduate students in Northern Thailand in problem-solving and critical-thinking skills.

Problem-solving Skills Results

This section focuses on the results of the data analysis from the second part of the questionnaire.

Table 4. Problem-solving Skill

Component	Question Items	Std	25%	Mean	75%
Encoding	Q1 (Considering different perspectives in problem-solving)	0.92	3.00	3.39	4.00
	Q2 (Curiosity about research gaps)	1.16	2.00	3.52	4.00
	Q3 (Distinguishing reliable sources)	0.95	3.00	3.44	4.00
	Q4 (Generating multiple solutions)	0.87	3.00	3.74	4.00
Integration	Q5 (Effective communication in problem statements)	0.88	4.00	3.91	4.00
	Q6 (Recognizing biases and assumptions)	0.84	3.00	3.54	4.00
	Q7 (Seeing connections in literature review)	0.79	3.00	3.50	4.00
	Q8 (Reflecting on thinking and learning)	1.06	3.00	3.56	4.00
	Q9 (Considering alternative explanations)	0.93	3.00	3.54	4.00
Application	Q10 (Evaluating evidence and arguments)	0.97	3.00	3.33	4.00
	Q11 (Evaluating research credibility)	0.88	3.00	3.37	4.00
	Q12 (Applying critical thinking to ethics)	0.96	3.00	3.37	4.00
	Q13 (Creative problem-solving beyond traditional use)	1.06	3.00	3.52	4.00
	Q14 (Fixation on traditional uses limiting creativity)	0.96	3.00	3.63	4.00
	Q15 (Recognizing and overcoming mental blocks)	0.89	3.00	3.69	4.00
Automaticity	Q16 (Difficulty breaking from preconceived ideas)	0.99	3.00	3.52	4.00
	Q17 (Adapting problem-solving strategies)	0.98	3.00	3.44	4.00
	Q18 (Recognizing limits of prior experience)	0.92	3.00	3.72	4.00
	Q19 (Generating innovative ideas)	1.04	2.25	3.43	4.00
	Q20 (Adapting strategies to unexpected challenges)	0.89	3.00	3.69	4.00

The investigation organized numerical data in Table 4 based on the four elements of problem-solving skills: Encoding, Integration, Application, and Automaticity. The survey contains specialized items to evaluate components beginning with Q1–Q4 for Encoding, Q5–Q9 for Integration, Q10–Q15 for Application and Q16–Q20 for Automaticity. The assessment items measure capabilities to view situations from opposing viewpoints while spotting biases, evaluating evidence, and adapting operational strategies. Student responses showed their best performance in Q5 regarding effective communication of problem statements, with an average score of 3.91, but they scored lowest at 3.33 in Q10 regarding evaluating evidence and arguments. The highest measurement variability appears under Q2 (Curiosity about research gaps), with a standard deviation of 1.16. The assessment criteria for student competencies include items Q4 (Generating multiple solutions) and Q18 (Recognizing limits of prior experience), which precisely measure cognitive abilities for innovative problem-solving and adaptability ability. Students demonstrate proficient communication skills while showing difficulty in evidence evaluation according to the scoring process (Q5 3.91 but Q10 3.33). The standard deviation of 1.16 for Q2 indicates that students have dissimilar Curiosity levels, which suggests the need for specific strategies to manage this variability.

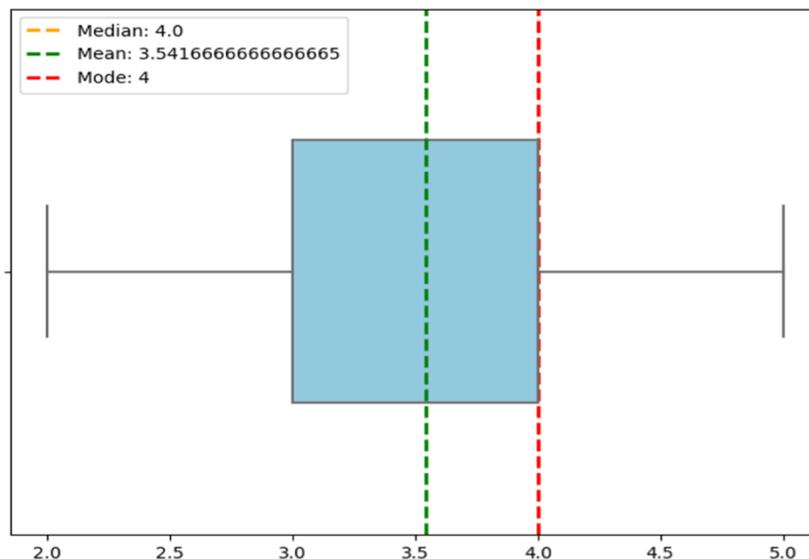


Figure 3. Problem-solving Skills

Analysis based on four components, Encoding, Integration, Application, and Automaticity, demonstrates diverse performance scores between dimensions according to problem-solving skill evaluations. Data shows that students performed well in Q4, Generating multiple solutions in Encoding with a mean rating of 3.74. Still, variability is high in Q2—Curiosity about research gaps with a Standard Deviation 1.16. The question on Effective communication in problem statements displayed the maximum mean score of 3.91 in Integration while Reflecting on thinking and learning exhibited higher measurement variability (Std=1.06). Most students face difficulties when evaluating evidence and arguments in Application (Q10), with a mean score of 3.33, yet students achieve a higher average of 3.69 in mental block recognition (Q15). Students display high adaptability levels in automaticity through their average rating scores on Q18 (Recognizing limits of prior experience) and Q20 (Adapting strategies to unexpected challenges), measuring 3.72 and 3.69 points, respectively, yet Q19 (Generating innovative ideas) shows more significant variability with a 1.04 standard deviation. Students show satisfactory problem-solving performance, yet the substantial differences among specific skill areas warrant particular training programs to improve uniform skill growth.

Comparison of the results between critical-thinking and problem-solving skills

Analyzing EFL postgraduate students’ problem-solving and critical-thinking skills yields essential information on the student’s proficiency. The analysis of the independent t-test delivered a t-score of 7.72 and a p-value of 4.97×10^{-9} , which evaluated Critical-thinking Skills and Problem-solving Skills scores. The statistical significance between critical thinking

and problem-solving skills for test performance emerged since critical thinking yielded better results than problem-solving according to the small p-value. The study provides data showing students perform poorly (compared to critical thinking) in solving practical issues using analytical reasoning and logical deduction. The results demonstrate a need for supplementary educational programs to reinforce problem-solving competence while encouraging their proficient skills in critical thinking.

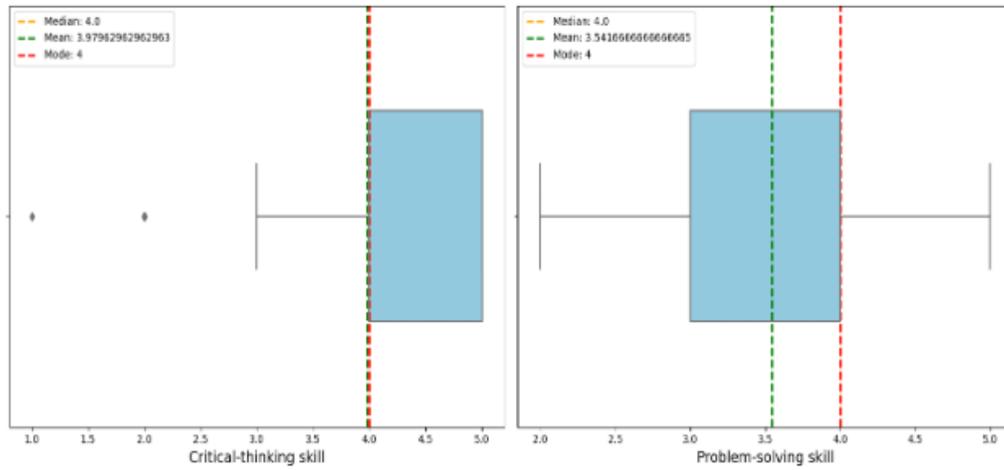


Figure 4. Comparison of Critical-thinking and Problem-solving Skills

The evaluation outcome delivers essential findings about students' performance in critical thinking (CTS) and problem-solving skills (PSS). The CTS section of the survey results demonstrate excellent performance in analytical reasoning followed by logical problem-solving abilities, creative thinking skills, and effective decision-making capabilities, mainly through strong scores in multi-perspective evaluation (Q9: 4.20) and innovative idea generation (Q12: 4.35). The findings from the PSS section of the survey show a satisfactory average of competency yet demonstrate considerable variation among individual categories. Effective communication showed strong performance, according to students (Q5: 3.91), but students faced challenges in evaluating evidence and arguments (Q10: 3.33). Two survey questions with noticeably high standard deviations between respondents assessed student proficiency in creative and analytical work (Q2 Curiosity about research gaps: 1.16 and Q13 Creative problem-solving beyond traditional use: 1.06). The research demonstrates why educational methods must be designed with specific objectives to address individual learning barriers and competence deficits. CTS analysis shows that demographic characteristics create limited measurement distinctions.

Qualitative data analysis

This section examines the qualitative data gathered through in-depth interviews conducted for the study. This comprehensive analysis looks closely at the qualitative responses, emphasizing themes, patterns, and unique perspectives from the personal experiences and ideas of the EFL postgraduate students.

Thematic analysis of the interview data

In this section, the results of the interview data have been discussed carefully based on the themes derived from the interviews.

Table 5. Supervision and Challenges in Postgraduate Studies among EFL Students

Themes	Codes	Verbatims
Importance of Effective Supervision	Code 1: Clear Communication	“Having clear communication with my supervisor has been crucial. When expectations and feedback are clearly outlined, it makes the research process much smoother.”
	Code 2: Trust-Building	“I feel more comfortable discussing challenges and asking for guidance when there’s a sense of trust in the supervisory relationship.”
	Code 3: Supportive Environment	“Knowing that my supervisor is supportive and encourages my progress keeps me motivated and committed to my research.”
	Code 4: Clear Boundaries and Expectations	“Understanding what my supervisor expects from the beginning helps me stay on track and manage my workload effectively.”
	Code 5: Student Autonomy	“Being given the freedom to take ownership of my research has made me more engaged and confident in my work.”
	Code 6: Celebrating Accomplishments and Milestones	“Acknowledging achievements during the research process boosts my motivation and helps me stay focused on my goals.”
	Code 7: Ongoing Support and Feedback	“Receiving regular feedback and support helps me refine my ideas and maintain steady progress in my research.”
Challenges in Postgraduate Studies	Code 8: Dealing with Conflicting Ideas	“I remember working on a group project where we had conflicting ideas. We had to devise a compromise that satisfied everyone while meeting the project goals. It required a lot of brainstorming.”
	Code 9: Navigating Methodological Challenges	“Once, we encountered a data analysis problem during a research project. We had to rethink our approach, break down the issue, and develop a new method to handle the data accurately. It was a real challenge.”

Importance of effective supervision

Open communication and trust are given top priority by supervisors who foster successful relationships with students. This creates a setting where students feel heard and encouraged, empowering them to talk freely about difficulties and take criticism without fear. A supportive environment keeps students motivated and engaged, lowering stress levels

throughout postgraduate coursework. Students are empowered to lead their research projects when clear limits and expectations are established, reducing conflict and increasing motivation and devotion. Students feel appreciated and directed in pursuing their academic goals when a friendly and productive research atmosphere is fostered by celebrating successes and providing regular feedback.

Challenges in postgraduate studies

Students' enthusiasm and commitment to their academic endeavors are fueled by praise and acknowledgment, which is crucial to their success. Frequent feedback fosters development and open communication by creating a supportive atmosphere. Supervisors have a vital role in strengthening connections with postgraduate students by highlighting the value of trust, communication, and support. Encouraging autonomy, recognizing accomplishments, providing ongoing support and feedback, and establishing boundaries are all critical components of creating a pleasant research environment. Postgraduate studies present challenges such as methodological obstacles and group disagreements, which call for flexibility, critical thinking to find creative solutions, and negotiating skills to resolve opposing opinions.

Table 6. Diverse Perspectives in Problem-Solving Approaches and University Support for EFL Postgraduates

Themes	Codes	Verbatims
Influence of Culture and Language	Code 1: Unique Problem-Solving Methods	"Different cultures offer unique approaches to problem-solving, shaping our critical thinking."
	Code 2: Language Nuances	"Language intricacies can influence how we understand and resolve issues in problem-solving."
Supportive Measures for EFL Postgrads	Code 1: Practical Problem-Solving	"Thai universities could integrate practical challenges into coursework for varied perspectives."
	Code 2: Diverse Group Work	"Encouraging diverse group work is vital to foster varied problem-solving approaches for students."
Culture's Impact on Problem-Solving	Code 1: Unique Problem-Solving Cultures	"Diverse cultural perspectives offer unique problem-solving approaches and impact critical thinking."
	Code 2: Language's Role	"Language nuances significantly affect how problems are approached and resolved in critical thinking."
Diverse Approaches and University Support	Code 1: Encouraging Diverse Perspectives	"Universities should promote varied viewpoints in problem-solving workshops for enriched learning."
	Code 2: Real-world Challenges	"Incorporating real-life challenges into the curriculum could greatly enhance problem-solving skills."

Influence of culture and language

The distinctive and varied approaches to problem-solving that originate from different cultures significantly impact our critical thinking. These unique methods create contexts, cultural norms, and beliefs that influence how individuals approach analysis and problem-solving. Linguistic elements are crucial to problem-solving because language significantly impacts how issues are seen, understood, and solved. Variations in language have an effect on people's cognitive processes, which in turn has an impact on the methods they employ to solve problems.

Supportive measures for EFL postgrads

Thai educational institutions ought to incorporate real-world challenges into their courses to give students various perspectives and experiences dealing with real-world difficulties. By presenting students with real-world challenges, universities can foster their capacity for critical thinking and help them expand their problem-solving skills. Encouraging a variety of group activities is essential to helping children develop a variety of problem-solving strategies. Collaborating with peers from diverse backgrounds enables the exchange of various problem-solving techniques and perspectives, enhancing the overall problem-solving skills of postgraduate EFL students.

Culture's impact on problem-solving

Diverse cultural perspectives offer unique approaches to problem-solving that significantly impact critical thinking. These approaches, which contribute to a more comprehensive framework for critical thinking and provide multiple viewpoints and answers to problems, are the outcome of cultural diversity. Language proficiency significantly influences how individuals approach and resolve issues, making problem-solving crucial.

Diverse approaches and university support

The study investigates how postgraduate EFL students in Northern Thailand use critical thinking and problem-solving skills regarding cultural diversity. The two most significant topics identified are "Importance of Effective Supervision" and "Challenges in Postgraduate Studies." Students are nurtured in a supportive atmosphere that encourages critical thinking with good supervision, clear communication, the development of trust, and accomplishment acknowledgment. The challenges include handling disagreements and overcoming methodological roadblocks, which require flexibility and creative problem-solving. Sufficient supervision and tackling these obstacles substantially impact postgraduate students' ability to develop critical thinking and problem-solving skills.

Table 7. Strategies in Research Process and Their Impact on Thesis/Proposal Quality

Themes	Codes	Verbatims
Research Process	Code 1: Critical Analysis	“Encountered contrasting opinions in various sources, had to analyze information critically.”
	Code 2: Synthesizing Information	“Juggling feedback from diverse sources to refine problem statement for a more comprehensive view.”
	Code 3: Integrating Perspectives	“Reflecting problem-solving skills, incorporating various viewpoints from literature and feedback.”
	Code 4: Formulating a Coherent Argument	“Strong link between problem-solving skills and the proposal/thesis quality.”
Problem-solving Strategies	Code 5: Incorporating Diverse Views	“Actively engaging in discussions, seeking diverse opinions, and iteratively revising based on feedback.”
	Code 6: Seeking Feedback	“Crafting the problem statement by incorporating feedback to ensure comprehensive coverage.”
	Code 7: Iterative Revisions	“Reflecting problem-solving and critical thinking abilities by integrating diverse perspectives.”
	Code 8: Incorporating Feedback	“Actively participating in discussions, seeking multiple viewpoints, and iteratively revising.”
Impact on Quality of Thesis/Proposal	Code 9: Quality Improvement	“Depth of analysis and innovative solutions directly impact the quality of the proposal/thesis.”

Research process

Students must carefully examine a variety of data sources to traverse opposing viewpoints. Building well-supported arguments in research assignments requires the critical assessment, analysis, and comparison of many points of view. Including input from several sources improves comprehension of the problem. Integrating different viewpoints, synthesizing thoughts, and assimilating data are necessary for topic mastery. The ability to solve the issues and form persuasive, well-supported arguments is correlated with the quality of a proposal or thesis. Innovative approaches and in-depth evaluations significantly raise the bar for research quality.

Problem-solving strategies

Discussion, considering other viewpoints, and editing in reaction to criticism are essential problem-solving techniques. They enable students to explore other points of view, resulting in a more profound understanding of the study subject. Students should improve research projects by refining issue descriptions, including different viewpoints from many sources, and iterating modifications in response to criticism. This iterative process guarantees that

research initiatives progress and produce thorough results while featuring critical thinking skills.

Impact on quality of thesis/proposal

This study, especially when writing theses and proposals, highlighted how vital these abilities are to improving the quality of their academic work. The study pinpointed several variables that impact skills acquisition and their successful implementation, emphasizing concepts like dialogue, establishing confidence, and the necessity of continuous assistance. The challenges were also discussed, including settling disagreements and getting beyond methodological issues. The results showed that students use a variety of strategies to support their work, including critical analysis, information synthesis, integration of different points of view, and repeated revisions. A person's ability to actively participate in discussion, consider other points of view, and incorporate feedback dramatically enhances the quality and depth of their ideas and theses.

Integration of the data sets; addressing research questions

This section concentrates on combining and synthesizing qualitative and quantitative data sets to effectively address the research questions stated at the outset of this study. Integrating these two distinct yet complementary data sets enables a comprehensive analysis beyond isolated anecdotes or numerical data.

Research question one

Qualitative data helps explain why some skills are better and justify the different levels and variability. For example, students' emphasis on the importance of clear communication and supportive supervision in the interviews aligned with their strong performance on Effective Communication in Problem Statements (Q5: 3.91). I believe one participant specifically on this statement: 'Having clear communication with my supervisor has made a huge difference.' 'Outlines expectations and feedback so that your research process is much smoother when that's the case.' This, however, shows that an environment that supports one's growth can greatly facilitate skills acquisition.

On the other hand, the challenges in Evaluating Evidence and Arguments (Q10: 3.33) and Generating Innovative Ideas (Q19: 3.43) have provided students' reports of methodological challenges and the influence of cultural and linguistic factors. For instance, 'During the research, we encountered a data analysis problem. It gave me something to rethink, break down the issue, and build a new way of handling the data correctly.' This accounts for the variation in Creative Problem-Solving Beyond Traditional Uses (Q13: 3.52) and Generating Multiple Solutions (Q14: 3.67) while considering complex, real-world problems among students. Furthermore, it can be explained why Curiosity has variability in Being Open to Research Gaps (Q2: 1.16) and Creative Problem Solving Beyond Traditional Uses for Student Learning (Q13: 1.06), following the students' mixed backgrounds and problem-solving approaches. One participant stated, 'Part of developing critical thinking is the different cultures provided different methods to solve problems.' However, this cultural diversity also adds to the diversity of perspectives and variability in students' approaches and

solutions to problems. Combining these quantitative and qualitative insights, the concept puts together a complete picture not just of the quantitative results but also of the necessity of specific interventions, including more supportive supervision, group work incorporating diversity, and incorporating real-world challenges within the curriculum to fill in the gaps and strengthen overall competency.

Research question two

Mixed quantitative and qualitative research findings indicate that the development of EFL postgraduate students' problem-solving ability and critical thinking skills can occur depending on several crucial factors. Essential tasks of thinking, such as Considering Multiple Perspectives (Q9: 4.20), were well performed by the students, whereas problem-solving tasks like Evaluating Evidence and Arguments (Q10: 3.33) and Generating Innovative Ideas (Q19: 3.43) did not present well in their performance. It was proven by student data that student critical thinking strength would be more assertive in strong supervision conditions because students generally know where to direct their attention when explicit instruction exists within trusted mentors and supportive classrooms. Blackboard data indicates that it is challenging for students to apply their skills to problems. Professional guidance would be helpful. Qualitative data influenced how students approach problem-solving through cultural variations in viewpoints and linguistic differences that caused performance disparities. Qualitative research about international students' language challenges has also revealed why their lower creative problem-solving scores are matched. However, the quantitative findings can be explained by combining methodological obstacles and conflicting ideas since students raised obstacles regarding integrating feedback and handling complex issues. Two solutions for increasing proficiency and improving performance variability included group work with different kinds of patients and involving students in solving real-world problems, and the students suggested this solution. Thus, Curiosity regarding research gaps (Q2: Std 1.16) has a high standard deviation, indicating significant variations in participants' commitment towards the research, which they attribute to their cultural backgrounds and native language systems. Combinations of cultural and problem awareness programs and hands-on experience with better supervision are shown to help train problem-solving skills. This approach, as demonstrated, is required to be addressed by educators because it would lead to better support for EFL postgraduate students in the development of essential competencies that can produce an improvement in their practical application. The observed variability is defined, and practical methods of developing some needed competencies are presented within the framework of an integrated approach.

Research question three

Evaluation combining multiple perspectives (Q9: Mean = 4.20) and communication effectiveness (Q5: Mean = 3.91) are key skills Northern Thailand EFL postgraduate students demonstrated based on quantitative data. The quantitative data shows that EFL postgraduate students in Northern Thailand display mastery in Critical Analysis and Incorporating Diverse Views when researching, as illustrated by this statement: 'Encountered contrasting opinions in various sources, had to analyze information critically.' The quantitative outcome from students (Q10: Mean = 3.33) and (Q14: Mean = 3.67) indicate significant difficulty in evaluating evidence alongside generating multiple solutions.

The students experienced difficulties through qualitative data reports by struggling to find accurate methods while handling conflicting ideas and methodological navigation according to student reports who needed to create new approaches. The considerable statistical distinction between critical thinking skills and problem-solving abilities (t-score = 7.72 p-value = 4.97×10^{-9}) demonstrates students perform exceptionally in theoretical scenarios yet struggle with practical problem application. The gap involves successful supervision requiring Clear Communication, Trust-Building measures, and Ongoing Feedback to make meaningful progress according to qualitative data. Students mentioned that their research process became smoother because they received apparent supervision and communication, which supports the need for structured problem-solving assistance. Culture alongside language determines skill growth since students witnessed 'different cultures present distinct ways of addressing problems,' which matches the results obtained through quantitative assessment. According to student recommendations, the curriculum needs Real-World Challenges and Diverse Group Work to help students develop better innovative thinking and adaptability abilities.

DISCUSSION

This study aimed to explore postgraduate English as a Foreign Language (EFL) students' problem-solving and critical thinking skills in Northern Thailand, taking a mixed methods approach to address the issue. These findings indicate that essential thinking skills concerning multiple perspectives and communication are crucial. Nevertheless, variability in problem-solving skills, particularly in evaluating evidence or creating original solutions, suggests these may be targeted. This discussion puts these findings in the proper context within the academic discussion, elucidates the research questions, and presents practical recommendations for the field of EFL education.

The quantitative finding shows that EFL postgraduate students have strong critical thinking skills in considering multiple perspectives and effective communication. These results agree with Ploysangwal (2018), who discovered that Thai EFL students are more successful in analytical tasks when guided and supported with relatively structured help. However, the variability of students solving problems, such as analyzing and evaluating the evidence and generating creative ideas, shows students' difficulties using theoretical knowledge for empirical situations. The results of this study are consistent with those of Namsaeng and Sukying (2021), who reported similar problems in analytical reading and problem-solving tasks among Thai undergraduate students. The results of these analyses, along with the associated qualitative data, help contextualize the fact that cultural factors, language barriers, and others impact skill levels. For illustration, international students stated that language nuances and cultural differences influenced their problem-solving tactics. These findings agree with Boonsathirakul and Kerdsomboon (2021), who concluded that university students' critical thinking disposition is affected by cultural backgrounds. This supports efforts to enhance demographic and linguistic diversity in skill development programs.

It seemed that proper supervision led to the skills of problem-solving and critical thinking. The participants underlined the notion of clear communication, trust-building, and supportive environments. This result echoes Srirak's (2023) suggestions on how mentoring and supervision can aid Thai EFL students in academic progress. However, other challenges were identified by the study, such as methodological barriers and group disagreements, which adaptability and creative problem-solving were posited to address. The challenges are

similar to what Wu and Buripakdi (2022) highlighted in the thesis writing barriers of EFL postgraduate students.

Additionally, cultural and linguistic background also impacted skill development; participants indicated that culture and language level affected their problem-solving methods. The result is in line with the argument of Azwati et al. (2022) that EFL learners need special training to overcome linguistic and cultural challenges. As suggested by the participants, the issues of integrating diverse group work and real-world challenges in the curriculum could be surpassed by the integrated recommendation of Rungsawang and Pookcharoen (2022) and Pimdee et al. (2024).

It was found that critical thinking skills strongly linked with thesis/proposal drafting were of good quality, especially in incorporating diverse perspectives and critical analysis. This result supports Nguyen (2025), who stressed that critical thinking is crucial in academic writing and argument construction. Nevertheless, participants struggled with problem-solving skills in practical situations, methodological barriers, and conflicting ideas. This is consistent with the findings of Vero and Puka (2018), who pointed out how iterative feedback and mentorship should exist to close the skill practical-based gap from the theory. The qualitative data showed that supervision and cultural factors are significant factors in determining the usefulness of the skill application. Participants emphasized continued support and feedback. This aligns with Vincent Lancrin et al. (2019), who argue that skills development requires structured support and culturally insensitive teaching methods. These findings signify the need to revamp the curriculum efforts for problem-solving and the adaptability to real-world problem-solving.

Qualitative and quantitative datasets are integrated to gain a more multifaceted perspective of skill development in EFL postgraduate students. Quantitative findings describe the problem-solving skill variability, and the qualitative data provide the reasons behind the variability regarding cultural and linguistic influences. For instance, the high standard deviation in the topic of research gaps results from the participants' cultural backgrounds and problem-solving methods. This finding agrees with Anjariyah et al. (2022), who demonstrated the existence of wealth through cultural diversity but introduced the presence of skill variability. Qualitative data also informs why these challenges are considered as challenges, such as the issues in determining evidence and creating new ideas. It took creative problem-solving and adaptability, as participants reported obstacles in methods and concepts. This resonates with the work of Li and Ren (2020), which emphasizes the need for critical thinking and problem-solving in dealing with complicated academic tasks.

The study has several limitations, which should be noted. The findings may not be generalized to the larger population due to the small sample of 54 participants, which limits the analysis of the effect of classroom dynamics on students' critical thinking and problem-solving skills as the data was based on self-report. Taking into account observational and self-reported measures would show more factors affecting skill development. The generalizability of findings could be expanded further if the geographic scope was expanded to include universities from other regions or countries. Such limitations align with issues raised in previous studies: small samples and methodological constraints. One particular issue or limitation of the study that needs to be addressed in future research is the need to have a more extensive and diverse sample with a large population, such as linguistic backgrounds, academic disciplines, geographic regions, etc.

CONCLUSION

A mixed methods approach explored how postgraduate EFL students in Northern Thailand would use their problem-solving and critical thinking skills to develop their language proficiency. These findings concern the individuals' critical thinking skills, specifically in considering multiple perspectives and competent communication. Yet, issues with problem-solving exist, particularly when evaluating evidence and developing novel solutions—areas where targeted interventions would be welcome. This has significant pedagogical implications regarding various aspects of EFL education in educators, curriculum designers, and policymakers to implement concrete strategies to improve the skill development of postgraduate students. Structured feedback sessions should be established to give students clear guidelines and constructive criticism to improve the supervisory practices. The participants mentioned support for continued work, as regular feedback helps refine an idea and maintain the steady progress of research. Building trust and a supportive environment where students can freely discuss their challenges or approach you for guidance is just as crucial. Finally, celebrating milestones and recognizing students' achievements can boost motivation and engagement since recognition is a key element of academic success. They agree with this study's findings and could provide a powerful impetus to managing the supervisory experience.

Another area to improve is the cultural sensitivity. Collaborative projects can help students from different cultural and linguistic backgrounds to encourage diverse group work, allow unique problem-solving, and enrich the learning experience. Culturally responsive teaching methods, including using examples from other cultural contexts as an example, can be integrated to make the learning process more relevant and inclusive. This approach offers a significant solution for international students' shortcomings and assures them that they are regarded and provided with emotional support for their academic progress. These curriculum enhancements are required to bridge the gap between theoretical knowledge gained and its application. A curriculum that includes real-world problem-solving tasks will enable students to sharpen their skills in solving problems they could come across in their academic and employment counterparts. Further development of students' skills in conducting analytical reasoning, logical deduction, and creative problem-solving can be done by organizing workshops on critical thinking and problem-solving utilizing known frameworks. The hands-on aspects and providing a deeper understanding of these complex concepts can be achieved through these workshops.

Iterative feedback, mentorship, and bridging theory and practice allow this. Giving students continuous input on ideas for a thesis or proposal is a way to clarify arguments toward more robust academic work. Offering personalized guidance and support, such as establishing mentorship programs that pair students with experienced researchers or faculty, students are guided through methodological challenges and conflicting ideas. Therefore, these strategies will ensure that the student gets the necessary help along the research process to increase the student's performance. The results of this study are significant for curriculum planning in EFL postgraduate education. This involves integrating critical thinking and problem-solving skills into core courses to develop students' competencies throughout their school careers. It is essential to allocate resources to give access to academic materials, mentorship, etc., specifically in regions where resources are scarce to facilitate skill development. Providing educators with professional development can help them improve their teaching strategies and keep them up to date with the most updated methods of fostering critical thinking and problem-solving skills.

Finally, the implications for EFL education point out the necessity of a supportive learning environment, considering cultural and linguistic factors that will increase the variability of the skill levels. Following and implementing the recommended approaches would help implement better EFL education. Although such a study presents valuable insights, future research must overcome its limitations, employ more significant, more diverse samples, and use observational data in addition to self-reported findings. More research will be undertaken on the interactions between the cultural, linguistic, and academic factors in developing skills to deepen the understanding of the obstacles and possibilities in an EFL system. Finally, this study extends the more considerable discussion of EFL education by suggesting practical recommendations for helping postgraduate students acquire problem-solving and critical-thinking skills. Addressing the identified skill gaps and adopting the recommended strategies in the context of educators and policymakers would lead to a more equitable and efficient educational establishment catering to the student's academic and professional readiness.

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