

## CLIL in Action: Enhancing Academic Writing and Content Knowledge in Indonesian University Students

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### ABSTRACT

This study investigates the effectiveness of Content and Language Integrated Learning (CLIL) in enhancing English writing proficiency and content knowledge among undergraduate students at Universitas Muhammadiyah Enrekang, Indonesia. A mixed-methods design was employed, combining quantitative pre-test and post-test assessments with qualitative surveys and classroom observations. The quantitative results revealed significant improvements in students' writing skills, particularly in structure, coherence, vocabulary, and grammar, with large effect sizes observed across these components. Additionally, students demonstrated considerable gains in their understanding of academic content, specifically in concept comprehension and terminology mastery. The qualitative data further supported these findings, with students reporting increased confidence in their academic writing and better integration of content knowledge and language. Classroom observations indicated that the structured writing tasks within CLIL lessons allowed students to better organize their thoughts and express complex ideas in English. However, the study also identified challenges, particularly in mastering academic terminology and integrating complex content with language learning. These findings suggest that CLIL is an effective pedagogical approach for improving both language proficiency and content knowledge, particularly in non-native English-speaking contexts. The study also highlights the importance of targeted vocabulary instruction and scaffolded content delivery to address the challenges faced by students. The results provide valuable insights into how CLIL can be adapted to enhance the quality of education in Indonesian higher education, particularly in regions with lower English proficiency. Future research could explore the long-term effects of CLIL and its potential for wider implementation across different academic disciplines in Indonesia.

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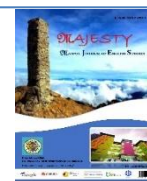




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### 1. Introduction

In today's rapidly globalizing world, higher education institutions face increasing pressure to equip students with skills that are academically relevant and globally competitive. One of the most significant aspects of this preparation is the development of both language proficiency and academic content mastery. This dual focus is particularly critical in non-native English-speaking countries like Indonesia, where English serves as the dominant language in international academic and professional contexts. Thus, improving students' English language skills alongside their subject-specific knowledge is essential for their success in a globalized world.

The concept of Content and Language Integrated Learning (CLIL) has emerged as a promising pedagogical approach in higher education to address this need. CLIL, which originated in Europe, integrates language learning with the teaching of academic content, aiming to improve both students' language skills and their understanding of subject-specific knowledge (Elihami & Ismail, 2017; Ismail, 2025; Lopriore, 2020; Rahmat et al., 2024). By adopting CLIL, educators can provide a more holistic approach to learning, where students not only acquire language proficiency but also engage deeply with academic content through the medium of that language. This approach not only enhances students' cognitive skills, such as critical thinking and problem-solving, but also ensures that language learning is meaningful and applied within real-world contexts (Banegas, 2017; Idris et al., 2025; Lingley, 2022).

In the context of Indonesia, where English proficiency remains a challenge for many students, particularly in rural areas, the implementation of CLIL presents a

unique opportunity. Traditional language instruction methods, which often separate language learning from content learning, have been critiqued for their limited ability to prepare students for real-world academic and professional challenges. In contrast, CLIL offers a more integrated approach, aligning language learning with the academic demands of students, thus making language learning more relevant and engaging (Cristina & Duarte, 2023; Lyu, 2022; Sari et al., 2024; Sirokmány, 2023). This is especially important as Indonesian universities seek to enhance the quality of education and better prepare students for the globalized job market.

However, despite the growing interest in CLIL globally, its implementation in Indonesian higher education remains underexplored. Research on CLIL has predominantly focused on European contexts, where the method was first developed and refined (Lysak, 2024; Lyu, 2022; Rakhimbekova et al., 2022). While studies have shown the benefits of CLIL in European settings, such as improved language proficiency and enhanced cognitive engagement with academic subjects (Coyle, 2008; Tudor, 2008), little attention has been given to its application in Indonesia. The Indonesian educational landscape presents unique challenges, including linguistic diversity, varying levels of English proficiency, and socio-cultural factors that influence the adoption of bilingual or multilingual teaching approaches. Thus, investigating the potential for CLIL in Indonesian higher education is essential to determine how this pedagogical approach can be adapted to meet local needs and overcome these challenges.

One of the key challenges in Indonesian higher education is the gap between students' English language

acquisition and their ability to use English in academic contexts. While English is taught as a foreign language in schools and universities, many students struggle to apply their language skills effectively in their academic writing and content learning. Research has highlighted that traditional methods of language instruction often fail to bridge this gap, as students are not exposed to enough real-world language use or academic discourse in English (Fang et al., 2022; Stainbank, 2022). Therefore, a pedagogical approach like CLIL, which integrates content learning with language learning, could be an effective solution to this problem. By using English as the medium of instruction in academic subjects, CLIL enables students to practice language skills in authentic, subject-specific contexts, thus facilitating the development of both language and content knowledge simultaneously.

Furthermore, the demand for English proficiency in Indonesia is linked not only to academic success but also to future career opportunities. As the country becomes more interconnected with global markets, proficiency in English is essential for students to compete in the international job market (Borràs & Moore, 2019; Goris et al., 2019; Itoi, 2024). However, Indonesian students often face difficulties in mastering academic English due to the traditional, grammar-focused nature of language instruction, which does not emphasize the development of subject-specific vocabulary or the integration of language with academic content (Fajardo Dack et al., 2020; Nieto, 2021; Zhetpisbayeva et al., 2018). CLIL, by contrast, provides a framework for teaching academic subjects in English, ensuring that students are exposed to both the language and the specialized terminology of their field of study. This dual focus on language and content knowledge is crucial for equipping students with the skills they need to succeed in the globalized workforce.

Despite the potential benefits of CLIL, the implementation of this approach in

Indonesian higher education faces several challenges. One of the primary obstacles is the availability of qualified instructors who are proficient in both the content area and the English language (Chaima & Ikhlas, 2024; Gabillon, 2022; Pham & Unaldi, 2022). Many Indonesian universities lack faculty members who are sufficiently trained in bilingual or multilingual teaching methodologies, and this has hindered the widespread adoption of CLIL. Moreover, there is a lack of appropriate instructional materials that support CLIL instruction, particularly in non-English language courses (Papaja, 2023; Pellicer et al., 2016). This gap in resources makes it difficult for instructors to effectively integrate content and language teaching (Nilsson & Lundqvist, 2022; Štefková & Danihelova, 2023; Suknović, 2024). To address these issues, Indonesian universities must invest in faculty development programs that provide teachers with the necessary skills to implement CLIL effectively, as well as in the development of high-quality teaching materials that support the integration of language and content.

Additionally, there are cultural and institutional factors that may influence the success of CLIL in Indonesia. In a country where the national language, Bahasa Indonesia, is dominant in most educational settings, there may be resistance to adopting a bilingual approach to teaching. Some students and educators may feel more comfortable using Bahasa Indonesia as the primary language of instruction, particularly in complex or technical subjects. However, studies from other multilingual contexts, such as in Europe and Latin America, have demonstrated that CLIL can be successfully implemented in settings where students are accustomed to learning in a language other than their mother tongue (Borràs & Moore, 2019; Tarasenkova, 2022). This suggests that, with proper support and training, CLIL can be adapted to the Indonesian context and help overcome the language barriers that many students face.

The importance of adapting CLIL to local contexts is further emphasized by research showing that while CLIL has been successful in some countries, its effectiveness can vary depending on the educational and cultural context in which it is implemented (Sirokmány, 2023; Strotmann et al., 2014). Therefore, this study aims to explore how CLIL can be adapted to the specific needs of Indonesian students, particularly at Universitas Muhammadiyah Enrekang, a university located in a rural area with relatively low levels of English proficiency. By investigating the effectiveness of CLIL in improving both English proficiency and content knowledge, this study seeks to provide insights into how this approach can be used to enhance the quality of education in Indonesian higher education institutions.

The primary research question of this study is: *How effective is the implementation of Content and Language Integrated Learning (CLIL) in enhancing both English language proficiency and content knowledge for students in Indonesian higher education, particularly at Universitas Muhammadiyah Enrekang?* This question addresses the need to evaluate whether CLIL can offer a balanced and integrated approach to learning that enhances both language and content mastery. The study also explores the challenges faced by both students and instructors in implementing CLIL in the Indonesian context and provides practical recommendations for improving its effectiveness.

CLIL has demonstrated significant potential in enhancing language proficiency and academic content knowledge, particularly in European contexts. However, its application in Indonesia remains relatively underexplored. This study seeks to address this gap by evaluating the effectiveness of CLIL in improving English proficiency and content knowledge among students at Universitas Muhammadiyah Enrekang. Additionally, the study aims to provide valuable insights into how CLIL can

be adapted to overcome the unique challenges faced by Indonesian higher education.

This study hypothesized that students in the experimental group, who received CLIL-based instruction, would show significant improvement in both English language proficiency and content knowledge compared to students in the control group who received traditional instruction. It was expected that the integration of content and language learning through CLIL would enhance students' academic performance and cognitive skills, particularly in critical thinking and problem-solving, and provide them with the necessary tools for global academic and professional success.

## 2. Material and Methods

### 2.1 Research Design

This study employed a mixed-methods design to assess the effectiveness of Content and Language Integrated Learning (CLIL) in enhancing both writing proficiency and content knowledge among students at Universitas Muhammadiyah Enrekang, Indonesia. The research design integrated both quantitative and qualitative data collection methods to provide a comprehensive evaluation of CLIL's impact.

The quantitative component utilized a one-group pre-test and post-test design to measure changes in students' writing skills and content knowledge before and after participating in CLIL-based lessons. Pre-test assessments were conducted at the start of the semester, and post-test assessments were conducted at the end of the semester to evaluate improvements. These assessments focused on writing structure, coherence, vocabulary, and grammar, as well as content knowledge integration.

In addition to the quantitative assessments, qualitative data were gathered through classroom observations and student surveys. Classroom observations were conducted to understand how the CLIL methodology was implemented in the classroom and to assess student engagement



during writing activities. Surveys provided insights into students' perceptions of CLIL, including their confidence in academic writing and their ability to integrate content with language.

## 2.2 Participants

The study involved 17 undergraduate students from the English Education program at Universitas Muhammadiyah Enrekang. The participants, aged 18-22 years, were enrolled in the 4th semester and had similar levels of prior English proficiency, determined by their TOEFL scores. These students were selected because they were enrolled in a course where both writing and content learning were integrated using English as the medium of instruction. The relatively small sample size was chosen to allow for an in-depth analysis of the experiences and outcomes of each student participating in the CLIL-based instructional environment.

## 2.3 Data Collection Methods

**Writing Proficiency:** The writing test assessed students' abilities in areas such as structure, coherence, vocabulary usage, and grammar. Students were asked to complete tasks such as academic essay writing, text summarization, and report writing. These tasks were designed to evaluate students' ability to present complex ideas clearly and coherently. **Content Knowledge:** The content knowledge component evaluated students' ability to integrate language with subject-specific content. Assessment tasks included writing assignments related to the students' academic disciplines, with an emphasis on clarity, terminology, and concept integration (Lysak, 2024; Papaja, 2023).

**Surveys and Questionnaires:** Surveys were distributed at the end of the semester to gather data on students' learning experiences, perceptions of CLIL, and self-reported progress in both writing and content areas. The questionnaire included Likert-scale items to quantify perceptions of CLIL, such as confidence in writing and content integration. It also contained open-ended questions to explore students'

reflections on their learning experiences and how they perceived the CLIL approach influenced their academic performance.

**Classroom Observation:** Classroom observations were conducted by the researchers to evaluate how CLIL-based lessons were implemented. The observer focused on aspects such as: (1) The instructional strategies used by the teacher to integrate content and language learning; (2) Student engagement during writing activities and discussions; and (3) The degree of interaction between students and instructors, especially during collaborative writing tasks. Field notes were taken to document observations on classroom dynamics and student participation, which were later analyzed thematically to supplement the survey data.

## 2.4 Data Analysis

**Quantitative Analysis.** The quantitative data from the pre-test and post-test assessments were analyzed using paired sample t-tests to evaluate whether there were significant differences in students' writing proficiency and content knowledge before and after the intervention. Descriptive statistics such as mean scores and standard deviations were calculated to summarize the data. In addition, Cohen's *d* was used to measure the effect size of the changes, providing insight into the magnitude of improvement in each component (structure, coherence, vocabulary, grammar, and content knowledge) (Cohen, 2013; Furukawa & Leucht, 2011).

**Qualitative Analysis.** Data from classroom observations and open-ended survey responses were analyzed using thematic analysis. The responses were coded for recurring themes, patterns, and student perceptions of the CLIL experience. This analysis aimed to identify common challenges, such as difficulties in using academic terminology, as well as students' strategies for integrating content and language. By triangulating these findings with the quantitative data, a more comprehensive understanding of the

effectiveness and challenges of CLIL in the classroom was obtained.

### 3. Results

#### 3.1 Writing Skills and Content Mastery

The results of the study indicate a significant improvement in students' writing skills following the implementation of the Content and Language Integrated Learning (CLIL) approach. In the Structure component, the average score increased from 6.371 (pre-test) to 8.235 (post-test), with a Cohen's *d* of 2.021, showing a large effect in students' ability to organize essay structures. Coherence also showed significant improvement, rising from 6.018 to 8.306, with a Cohen's *d* of 2.550, indicating

a major enhancement in organizing ideas coherently. In the area of Vocabulary, the average score increased from 6.159 to 8.212, with a Cohen's *d* of 2.490, demonstrating significant development in academic vocabulary usage. For Grammar, the average score rose from 5.941 to 8.429, with a Cohen's *d* of 2.597, reflecting a large improvement in grammar. Finally, the Total Score increased from 24.488 (pre-test) to 33.182 (post-test), with a Cohen's *d* of 4.167, indicating a substantial overall improvement in students' writing skills. Overall, these results show that CLIL significantly enhanced students' writing abilities across all tested components.

**Table 1** Descriptive Statistics for Writing Proficiency

Assessment Components	Pre-test		Post-test		Cohen's_d
	Mean score	Std_Dev	Mean score	Std_Dev	
Structure	6.371	0.791	8.235	1.038	2.021
Coherence	6.018	0.857	8.306	0.936	2.55
Vocabulary	6.159	0.844	8.212	0.805	2.49
Grammar	5.941	0.768	8.429	1.116	2.597
<b>Total</b>	<b>24.488</b>	<b>1.907</b>	<b>33.182</b>	<b>2.252</b>	<b>4.167</b>

Table 2 presents the descriptive statistics for content knowledge based on the pre-test and post-test scores, including the mean scores, standard deviations, and Cohen's *d* (effect size) for each assessment component. The components assessed were

Concept, Integration, Terminology, and the Total score, which provides a comprehensive evaluation of students' content knowledge before and after the implementation of the Content and Language Integrated Learning (CLIL) approach.

**Table 2** Descriptive Statistics for Content Knowledge

Assessment Components	Pre-test		Post-test		Cohen's_d
	Mean Score	Std Dev	Mean Score	Std_Dev	
Concept	6.418	0.977	8.282	0.957	1.929
Integration	6.447	1.133	7.871	2.246	0.8
Terminology	6.241	0.834	8.406	0.751	2.727
<b>Total</b>	<b>19.106</b>	<b>1.97</b>	<b>24.559</b>	<b>2.404</b>	<b>2.482</b>

The results from the content knowledge assessment demonstrate significant improvements across all components following the implementation of the Content and Language Integrated Learning (CLIL) approach. In the Concept component, the mean score increased from

6.418 to 8.282, with a large Cohen's *d* of 1.929, indicating a substantial improvement in students' understanding of key concepts. The Integration component showed a more modest improvement, with the mean score rising from 6.447 to 7.871 and a Cohen's *d* of 0.8, suggesting a medium effect in students'

ability to integrate content and language. The Terminology component saw the most significant improvement, with the mean score increasing from 6.241 to 8.406 and a Cohen's *d* of 2.727, reflecting a large effect in students' mastery of academic terminology. Finally, the overall Total Score improved from 19.106 to 24.559, with a Cohen's *d* of 2.482, indicating a large overall effect in enhancing both content knowledge and language proficiency. These findings highlight the effectiveness of the CLIL approach in improving both language and content

mastery, particularly in areas like terminology and concept understanding.

### 3.2 Students Responds

Table 3 presents the overall mean scores and standard deviations (SD) based on students' perceptions of their learning experiences after participating in Content and Language Integrated Learning (CLIL) lessons. The survey items assess various aspects of the CLIL approach, including confidence in writing, content integration, academic skills improvement, and motivation to continue learning.

**Table 3** Overall Mean with SD on the students' perceptions of CLIL.

Statements	Mean	Standard Deviation (SD)	Description
1. I feel more confident in writing academic essays in English after taking CLIL lessons	4.12	0.332	A
2. CLIL helps me understand the course material better	4.18	0.393	A
3. I can integrate content knowledge with academic writing more effectively.	4.00	0.612	A
4. Writing activities in CLIL classes make me more active and involved in learning.	3.94	0.556	N
5. The instructor provides adequate guidance in writing and mastery of content.	4.18	0.393	A
6. I feel that my academic skills have improved during CLIL lessons.	4.12	0.697	A
7. CLIL helps me write more coherently and logically.	4.00	0.707	A
8. I am interested in continuing to learn English writing through the CLIL approach.	4.24	0.664	A
9. I can express my ideas more clearly in academic writing.	3.88	0.781	N
10. CLIL lessons increase my motivation to learn language and content simultaneously.	3.71	0.588	N

Description: SD (Strongly Disagree): 1.00 - 1.99; D (Disagree): 2.00 - 2.99; N (Neutral): 3.00 - 3.99; A (Agree): 4.00 - 4.99; SA (Strongly Agree): 5.00

The students' responses to the CLIL approach were generally positive across all aspects. Most students reported feeling more confident in writing academic essays in English after taking CLIL lessons, with a mean score of 4.12. CLIL was also perceived as helpful in enhancing understanding of course material (mean: 4.18) and enabling better integration of content with academic writing (4.00). Writing activities in CLIL classes were considered to increase student engagement, though there was still room for improvement in making students more

active (3.94). The guidance provided by instructors in both writing and content mastery was deemed adequate (4.18), and students felt that their academic skills had improved during CLIL lessons (4.12). CLIL was also credited with improving writing coherence (4.00) and fostering interest in continuing to learn English writing (4.24). While students reported a moderate improvement in expressing ideas clearly (3.88), they felt slightly less motivated by the integration of language and content learning (3.71).

The results indicate that students generally perceive CLIL as beneficial in improving their academic writing skills, understanding of course material, and engagement in learning. Although most students expressed positive outcomes, the data also reveal areas for improvement, particularly in terms of expressing ideas clearly and increasing motivation to learn both language and content simultaneously. The relatively consistent ratings across the items suggest that CLIL has been positively received by students, although there remains room for refinement to further enhance the learning experience.

## 4. Discussion

### 4.1 The Impact of CLIL on Writing Proficiency

The results from this study clearly indicate that Content and Language Integrated Learning (CLIL) significantly enhanced students' writing proficiency. The quantitative data revealed substantial improvements in the core components of writing, namely structure, coherence, vocabulary, and grammar, which is consistent with prior research highlighting CLIL's positive influence on students' academic writing in foreign languages (Coyle et al., 2010; Papaja, 2023). The Cohen's *d* values in this study, particularly in structure (2.021) and coherence (2.550), indicate a large effect, suggesting that the integration of content and language learning played a pivotal role in enhancing students' writing skills.

In addition to these quantitative results, the qualitative data—drawn from classroom observations and open-ended survey responses—provided valuable insights into how CLIL influenced students' writing processes. Many students described how the structured writing tasks within CLIL lessons allowed them to organize their thoughts more effectively, resulting in clearer and more coherent academic writing. As one student remarked, "The writing activities in CLIL helped me not only structure my essays better but also think critically about what I was writing." This is particularly important in academic writing, where the ability to logically organize and present arguments is a

key skill (Hidalgo & Ortega-Sánchez, 2023; Lopriore, 2020). This observation aligns with Coyle et al. (2010), who argued that CLIL promotes both the development of language skills and cognitive engagement with content, thus improving students' writing proficiency through active learning and reflection.

Moreover, the increased confidence in writing, as reported by students (mean = 4.12), underscores the emotional and cognitive benefits of CLIL. Studies by Stainbank (2022) have shown that CLIL fosters a positive learning environment, where students feel more engaged and empowered to use the language in academic contexts. The students in this study, particularly those who had previously struggled with academic writing in English, reported feeling more capable of expressing their ideas clearly and confidently.

### 4.2 Content Knowledge Enhancement

CLIL's impact on content knowledge was equally significant. The results showed large improvements in content comprehension, particularly in the Concept and Terminology components, with Cohen's *d* values of 1.929 and 2.727, respectively. This suggests that CLIL not only helped students improve their English language skills but also deepened their understanding of the academic content they were learning. This finding is supported by Lysak (2024), who highlighted that CLIL promotes a deeper cognitive engagement with content by requiring students to process and understand academic material in a foreign language.

One of the most notable aspects of the improvement in content knowledge was the students' ability to master academic terminology. According to Goris (2022), the ability to use subject-specific vocabulary effectively is crucial in enhancing both language proficiency and content comprehension. The students in this study demonstrated that as they were required to use academic terminology in their written work and class discussions, they became more familiar with and confident in using



these terms. This was reflected in the qualitative data, where several students expressed that the increased focus on academic language helped them gain a deeper understanding of the subject matter. One student noted, "Using the new terms I learned in class in my writing has made me understand the content much better. I feel more connected to the material." This finding aligns with the results from the pre-test and post-test assessments, where students demonstrated enhanced proficiency in understanding and applying academic terminology in their writing tasks.

Furthermore, the study highlights the importance of integration between language and content knowledge. Many students reported that writing about course material in English required them to think critically about both the content and the language. This process not only helped them improve their language skills but also deepened their understanding of the subject matter. As Coyle (2008) emphasized, this integrated approach facilitates the simultaneous development of cognitive and language skills, making the learning experience more meaningful and effective.

#### *4.3 The Interrelationship Between Language and Content Mastery*

A key finding from this study is the interrelationship between language acquisition and content mastery, which was particularly evident in the students' performance. As students improved their English language proficiency, they also demonstrated a better understanding of the academic content they were learning, and vice versa. This reciprocal relationship is consistent with the findings of (Banegas, 2017), who argued that CLIL creates a synergistic effect where language and content development are mutually reinforcing.

The qualitative data further illustrated this relationship. Students reported that the process of articulating complex ideas in English forced them to engage with the material on a deeper level, ultimately enhancing their understanding of the

subject. One student commented, "I had to think harder about the concepts because I had to explain them in English. This made me understand the material better." This reflects the cognitive benefits of CLIL, where students are encouraged to engage with content in a foreign language, leading to enhanced critical thinking and problem-solving skills. Studies by Lopriore (2020); Lyu (2022) have similarly found that CLIL encourages deeper cognitive engagement by challenging students to express academic content in a foreign language, requiring higher-order thinking skills.

Quantitatively, the students' improved content integration (Cohen's  $d = 0.8$ ) further demonstrates how language skills and content knowledge were intertwined in this study. While the improvement in integration was more modest than in writing proficiency or content knowledge, it highlights the importance of continuous practice in integrating both domains. This process can be challenging, especially when students are unfamiliar with both the academic content and the language in which it is taught. However, as Coyle (2008); Lysak (2024) suggest, CLIL offers a powerful approach for overcoming these challenges, fostering a deeper connection between language and content.

#### *4.4 Challenges and Recommendations for Improvement*

Despite the promising outcomes, the study also identified several challenges that need to be addressed to improve the effectiveness of CLIL, particularly in an Indonesian context. One challenge highlighted by students was their difficulty in mastering academic terminology, especially in more complex or technical subjects. This is consistent with Stainbank, (2022); Strotmann et al. (2014), who noted that mastering discipline-specific terminology is one of the key hurdles in CLIL, particularly when the subject matter is complex. Many students reported that while they improved their vocabulary, they struggled with the proper usage of academic terms in more technical contexts.

To address this, it is recommended that targeted vocabulary instruction be incorporated into the CLIL curriculum. This could include providing students with subject-specific glossaries, vocabulary-building exercises, and opportunities to use new terms in meaningful contexts. As Goris et al. (2019) suggests, the integration of vocabulary instruction with content learning helps students better retain and use academic terminology, ultimately enhancing both their language proficiency and content comprehension.

Another significant challenge was the complexity of content integration, particularly in subjects with a heavy reliance on technical or abstract concepts. Some students found it difficult to express complex ideas in English, particularly when they lacked prior knowledge of the content. Papaja (2023) highlights that content-heavy subjects often require more scaffolded learning, where students are gradually introduced to complex ideas in manageable chunks. To address this, instructors could use a scaffolding approach that provides additional support during the early stages of learning, gradually increasing the complexity of tasks as students gain proficiency in both language and content.

## 5. Conclusion

This study has demonstrated that Content and Language Integrated Learning (CLIL) significantly enhances both English proficiency and content knowledge among students at Universitas Muhammadiyah Enrekang. The results from the quantitative and qualitative analyses indicate that CLIL is an effective pedagogical approach for improving key academic skills, particularly in writing proficiency and academic content mastery. The improvements observed in the students' writing structure, coherence, vocabulary, and grammar, as well as their understanding of academic concepts and terminology, underline the dual benefits of this approach in fostering both language and cognitive development.

The reciprocal relationship between language acquisition and content mastery

emerged as a key theme in this study, highlighting how the integration of content and language learning through CLIL facilitates deeper engagement with both the subject matter and the language used to express it. As students developed their writing skills in English, they also gained a deeper understanding of their academic disciplines. Conversely, their increasing familiarity with content-specific terminology helped them refine their language skills, making the learning process more meaningful and effective.

Despite these positive outcomes, the study also identified several challenges that need to be addressed in order to fully capitalize on the potential of CLIL in the Indonesian higher education context. Specifically, the mastery of academic terminology remains a significant hurdle for many students, particularly in more technical or specialized subjects. Additionally, students faced difficulties integrating complex content with language learning, which highlights the need for more targeted support and scaffolded learning experiences to help students build confidence and competence in both areas.

To improve the effectiveness of CLIL, it is recommended that vocabulary instruction be more explicitly incorporated into the curriculum, focusing on the specific academic language required in students' fields of study. Providing students with context-specific glossaries, interactive vocabulary-building exercises, and ample opportunities for language practice in real-world contexts can help them better acquire and retain academic terms. Moreover, a more scaffolded approach to teaching complex content, with gradual increases in difficulty, could support students in mastering both language and content simultaneously.

Overall, this study contributes to the growing body of research on CLIL, particularly in non-European contexts like Indonesia. It provides valuable insights into how this approach can be adapted to meet the unique challenges of Indonesian higher education, where improving both English proficiency and content knowledge is crucial

for students' success in a globalized academic and professional landscape. By addressing the identified challenges and implementing the recommended improvements, CLIL has the potential to become an even more powerful tool for preparing Indonesian students for academic and professional success in an increasingly interconnected world.

### Ethical considerations

Research approval has been granted by the research and community service institute of Universitas Muhammadiyah Enrekang, Indonesia.

### Conflict of Interest

The authors declare that they have no conflict of interest.

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