

Research Article

Analysis of English-Indonesian Text Translation Errors Among Sixth-Semester Mathematics Education Students

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Abstract: Translation is a complex process of transferring meaning from a source language to a target language, requiring not only lexical knowledge but also a deep understanding of the context and subject-specific terminology. This study analyzes the errors made by sixth-semester students of the Mathematics Education Study Program at UIN Syekh Ali Hasan Ahmad Addary Padangsidimpuan in translating an English academic text into Indonesian. The research employed a descriptive qualitative method. The population comprised all 64 students enrolled in the Mathematics English course during the even semester of the 2025/2026 academic year, with the entire population serving as the sample (total sampling). The instrument was a translation task of an excerpt from a mathematics education article. The findings reveal that students made significant errors in translating mathematical terminology (e.g., “equivalent fractions”) and pedagogical terms (e.g., “cognitively demanding task,” “instructional task”). The primary cause of errors was the tendency to translate word-for-word without grasping the overall context of the text, compounded by limited time for revision. These findings highlight the need for instructional strategies that emphasize contextual comprehension over literal translation.

Keywords: translation errors; English for specific purposes; mathematics education; academic text translation

1. Introduction

The conceptual foundation of translation as a communicative act rather than a mere linguistic exercise is essential to understanding the difficulties faced by students in academic settings. As Bassnett (2002) articulates, translation fundamentally involves the transfer of a message from a source language (SL) to a target language (TL), emphasizing that the core objective is the preservation and accurate transmission of meaning across linguistic boundaries. This perspective challenges the simplistic view of translation as a mechanical process of word substitution, instead positioning it as a complex cognitive operation that demands sensitivity to the semantic, syntactic, and pragmatic dimensions of both languages involved. For students engaged in translation tasks, particularly those in non-linguistic disciplines, this conceptual understanding is crucial, as it shapes their approach to decoding and reconstructing texts in ways that respect the integrity of the original message while ensuring clarity and coherence in the TL (Dahlan & Latif, 2020).

The complexity of translation extends beyond linguistic knowledge to encompass a deep awareness of the cultural contexts embedded within both the SL and TL. It was emphasized that adequate translation cannot be achieved without a thorough understanding of the cultural frameworks and structural characteristics that shape how meaning is constructed and conveyed in different languages (Nurlaila & Irlina, 2021). This cultural-linguistic interplay is particularly significant when translating academic texts, which often contain discipline-specific conventions, implicit assumptions, and culturally bound references that may not have direct equivalents in the TL. For mathematics education students, this means that successful translation requires not only proficiency in English and Indonesian but also familiarity with the academic discourse practices and conceptual frameworks that characterize educational research in both linguistic contexts (Ernita, 2025).

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The imperative for mathematics education students to develop strong translation skills is underscored by the central role that English-language academic texts play in contemporary scholarly communication. As Kusumawati (2014) notes, the ability to translate journal articles and textbooks from English into Indonesian is crucial for students seeking to access the latest developments in their field and to engage with the global research community. In mathematics education, where theoretical frameworks, pedagogical innovations, and empirical findings are predominantly disseminated in English, students' capacity to comprehend and translate these materials directly impacts their academic development and their preparedness for conducting independent research. This is particularly relevant for students in non-English speaking countries, where access to translated materials may be limited and where the responsibility for engaging with English-language sources often falls on individual learners (Saragih & Shofa, 2016).

The challenges inherent in translating academic texts are magnified for students in fields like mathematics education, where texts are characterized by specialized vocabulary, complex conceptual relationships, and discipline-specific rhetorical conventions (Mpalami & Mahloane, 2026). Unlike general language texts, academic articles in mathematics education employ precise terminology to describe mathematical concepts, pedagogical approaches, and research methodologies – terms that often lack straightforward equivalents in Indonesian. Furthermore, these texts embed arguments within theoretical frameworks that may be unfamiliar to students, requiring them to navigate not only linguistic but also conceptual terrain. The task of translation thus becomes an exercise in disciplinary literacy, demanding that students simultaneously decode language, interpret meaning, and reconstruct knowledge in ways that are accessible and accurate in the TL (Saragih & Shofa, 2016).

The integration of these foundational perspectives establishes a robust theoretical framework for investigating translation errors among mathematics education students. Bassnett's emphasis on message transfer, Larson's attention to cultural and structural understanding, and Kusumawati's focus on the practical importance of translation for academic success collectively highlight the multifaceted nature of the translation process. When students produce inaccurate or awkward translations, as documented in the preceding tables, these errors can be understood not merely as failures of vocabulary but as symptoms of deeper challenges related to meaning comprehension, cultural-linguistic awareness, and disciplinary literacy (Hartati et al., 2023). This framework provides a lens through which to interpret the patterns of error observed in students' translations and to develop pedagogical interventions that address the root causes of translation difficulties, rather than treating them as isolated lexical problems (Saragih & Shofa, 2016).

For students in non-linguistic fields such as mathematics education, the ability to translate English academic texts – such as journal articles and textbooks – is crucial for accessing the latest scientific developments and for completing their final theses (Kusumawati, 2014). At the Mathematics Education Study Program of UIN Syekh Ali Hasan Ahmad Addary Padangsidempuan, students are equipped with English language skills through English for Specific Purposes (ESP) courses, including a dedicated Mathematics English course in the sixth semester. This course aims to familiarize students with mathematical and pedagogical vocabulary in English. However, informal observations indicate that students still face significant difficulties when tasked with translating academic articles, often resulting in translations that are inaccurate and obscure the original message (Erdiana et al., 2023).

Previous research by Kusumawati (2017) at a different university identified that students' difficulties in translating English mathematics texts stem from a lack of vocabulary and a tendency to translate word-for-word. Taking this into consideration, this study seeks to build upon those findings by analyzing the specific types of translation errors made by mathematics education students at the UIN Syekh Ali Hasan Ahmad Addary Padangsidempuan. Moreover, it aims to identify the most problematic categories of vocabulary (mathematical vs. pedagogical) and to describe the students' translation processes. By understanding these errors, educators can develop more targeted interventions to improve students' academic literacy in English.

2. Materials and Methods

This study employed a descriptive qualitative research method to identify and analyze the translation errors made by sixth-semester mathematics education students when translating an English academic text into Indonesian. The descriptive qualitative approach was selected because the study focused on examining, categorizing, and interpreting the types

and patterns of translation errors found in the students' written work. The study was conducted at the mathematics education Study Program, Universitas Islam Negeri Syekh Ali Hasan Ahmad Addary Padangsidempuan, during the even semester of the 2025/2026 academic year.

The population consisted of all 64 sixth-semester students enrolled in the Mathematics English course during the study period. The students were distributed across two classes. Since the entire population was included in the study, a total sampling technique was employed, resulting in a sample of 64 students. The participants had previously received instruction in ESP, including mathematical vocabulary and the use of English in mathematics-related academic contexts.

The primary research instrument was an English-to-Indonesian translation test. The students were asked to translate an excerpt from an English-language mathematics education journal article into Indonesian. The source text comprised approximately 200 words and included general English vocabulary, mathematical terminology, and pedagogical terminology commonly used in mathematics education research. The mathematical terms included fraction, equivalent fractions, number line, smallest, and largest, whereas the pedagogical terms included task, cognitively demanding task, instructional task, and learning opportunities. These terms were analyzed because they represented important subject-specific concepts requiring both linguistic knowledge and an understanding of mathematics education.

The translation test was administered during a scheduled Mathematics English class. Before completing the task, the students were informed about the purpose and procedures of the activity. They were given 90 minutes to read the source text and translate it into Indonesian. After the allocated time had elapsed, all written translations were collected and prepared for analysis. To protect the participants' identities, the students' responses were coded, and their names were not included in the presentation or interpretation of the findings.

Data analysis was conducted by adapting the translation analysis principles proposed by Sarki (2005), with particular attention to source-text comprehension and the accurate transfer of meaning into the TL. The analysis was performed in several stages. First, the students' translations were read and compared with the meanings and context of the English source text.

Second, the translations of the article title and the selected mathematical and pedagogical terms were identified and classified as accurate, inaccurate, omitted, or untranslated. Third, inaccurate translations were examined to identify recurring error patterns, including inappropriate word choice, literal or word-for-word translation, omission, the use of non-standard disciplinary terminology, and failure to convey the intended contextual meaning. The frequency of accurate translations was calculated to illustrate the distribution of responses, while the qualitative analysis was used to describe and interpret the nature of the errors.

Finally, the identified errors were grouped according to the type of vocabulary involved, namely mathematical vocabulary and pedagogical vocabulary. The students' translation patterns were then interpreted to determine the areas that presented the greatest difficulty and to identify the dominant translation strategies reflected in their work. Conclusions were drawn regarding the students' ability to comprehend and transfer the meaning of English academic texts into Indonesian and the common factors contributing to translation inaccuracies.

3. Results

This section presents the analysis of the translation task completed by the 64 sixth-semester students. The findings are organized into the translation of the title, mathematical vocabulary, and pedagogical vocabulary.

3.1. Translation of the Article Title

The title of the provided text was a variation of "A Fraction Activity Using a Number Line." The students' translations varied widely, with many producing inaccurate or awkward renditions. Table 1 shows the variety of translations and the number of students who produced them.

Table 1. Student translations of the article title.

Translated title	Number of students (n=64)
1. Aktifitas pecahan menggunakan garis bilangan.	32
2. Pecahan menggunakan menggunakan garis bilangan.	8
3. Pembelajaran pecahan menggunakan garis bilangan.	6
4. Operasi pecahan menggunakan garis bilangan.	4
5. Mengurutkan pecahan menggunakan garis bilangan.	2
6. Pengenalan pecahan menggunakan garis bilangan.	2
7. Pecahan digunakan pada garis bilangan.	2
8. Pecahan aktif menggunakan garis bilangan.	1
9. Pembelajaran himpunan menggunakan garis bilangan.	1
10. Tidak menerjemahkan / menulis judul asli	6

Indonesian translations of the English article title “A Fraction Activity Using a Number Line” were produced by 64 sixth-semester students who enrolled in the Mathematics Education Study Program at UIN Syekh Ali Hasan Ahmad Addary Padangsidimpuan. The data reveal a considerable diversity in translation outcomes, reflecting varying levels of comprehension and interpretation of the source text. Although the title is relatively short and syntactically simple, the wide range of translations indicates that students encountered difficulties in grasping the intended meaning, particularly in relation to the pedagogical context of the source material. This variation serves as an early indicator of the challenges students face in transferring meaning accurately from English to Indonesian, especially in academic and subject-specific contexts.

The most frequently occurring translation, produced by 32 students, was “aktifitas pecahan menggunakan garis bilangan” (incorrect spelling of “aktivitas”). While this version preserves the core lexical items from the source text, it results in a semantically awkward construction. The phrase implies that the fraction itself is performing an activity, which is illogical in both mathematical and pedagogical terms. This translation reflects a literal, word-for-word approach to translation, where students prioritized lexical equivalence over meaning. Such an approach overlooks the importance of contextual interpretation and demonstrates a lack of awareness regarding the natural flow and logic of the TL (Basith & Tathahira, 2025).

A smaller group of eight students rendered the title as “pecahan menggunakan menggunakan garis bilangan”, which contains a grammatical redundancy through the repetition of the word “menggunakan” (to use). This error further illustrates the tendency to translate mechanically without adjusting for grammatical accuracy in Indonesian. In contrast, six students produced the translation “pembelajaran pecahan menggunakan garis bilangan”, which more closely approximates the intended meaning of the original title by explicitly incorporating the concept of “learning” or “instruction.” This version demonstrates a more advanced level of comprehension, as it reflects an understanding that the article pertains to a pedagogical activity involving fractions (Evans, 2019).

Other translations, such as “operasi pecahan menggunakan garis bilangan” (four students), “mengurutkan pecahan menggunakan garis bilangan” (two students), and “pengenalan pecahan menggunakan garis bilangan” (two students), show that some students attempted to infer the content of the article from its title. Although these interpretations are not entirely inaccurate, they introduce elements not explicitly stated in the source text, such as “operation,” “ordering,” or “introduction.” These additions suggest that students may have relied on prior knowledge or assumptions about the topic, rather than basing their translation solely on the linguistic and contextual cues present in the original title (Basith & Tathahira, 2025).

Finally, six students did not provide an Indonesian translation at all, instead reproducing the original English title. This may indicate a complete inability to comprehend the title or a lack of confidence in producing an appropriate equivalent. Overall, the data highlight a predominant pattern of literal translation and a limited ability to infer meaning from context. The findings underscore the need for instructional strategies that move beyond vocabulary-based translation exercises and emphasize the development of contextual understanding and meaning-based translation competence (Evans, 2019).

The most common translation, “aktifitas pecahan menggunakan garis bilangan” (Fraction activity using a number line), is problematic as it implies the fraction itself is performing an activity. More accurate translations, such as “pembelajaran pecahan menggunakan garis bilangan” (fraction learning using a number line) or “mengurutkan

pecahan menggunakan garis bilangan” (ordering fractions using a number line), were produced by a minority of students. This indicates a difficulty in grasping the intended meaning of the title as a pedagogical activity.

3.2. Translation of Mathematical Vocabulary

The text contained several key mathematical terms. Table 2 summarizes the students’ accuracy in translating these terms.

Table 2. Translation accuracy of mathematical vocabulary (n=64).

English term	Correct translation	Number of students with correct translation	Common errors
Fraction	Pecahan	62	Himpunan (1)
Number line	Garis bilangan	64	-
Smallest	Terkecil	64	-
Largest	Terbesar	62	Besar (2)
Equivalent fractions	Pecahan senilai	18	Pecahan setara, persamaan ekivalen, pecahan yang sama, himpunan yang ekivalen, (44 students made errors, 2 no answer)

The table above presents a detailed overview of the translation accuracy of key mathematical vocabulary encountered in the English source text by 64 sixth-semester mathematics education students. The table categorizes five essential mathematical terms – “fraction”, “number line”, “smallest”, “largest”, and “equivalent fractions” – alongside their correct Indonesian equivalents, the number of students who translated them accurately, and examples of common errors. The data reveal a clear pattern: while students demonstrated a strong command of basic, high-frequency mathematical terminology, their performance declined significantly when confronted with more conceptually complex or less familiar terms. This disparity highlights the varying levels of lexical mastery among students and points to specific areas where pedagogical intervention is most urgently needed.

The terms “number line” and “smallest” were translated correctly by all 64 students, indicating universal comprehension of these foundational mathematical concepts. The Indonesian equivalents (“garis bilangan” and “terkecil”) are well-established in the mathematics curriculum and frequently encountered in both instructional materials and classroom discourse. Similarly, the terms “fraction” and “largest” were accurately rendered by 62 students each, with only minimal errors. In the case of “fraction”, a single student incorrectly translated it as “himpunan” (set), while for “largest”, two students used the more general term “besar” (big) instead of the precise comparative form “terbesar”. These minor errors suggest that while students are generally proficient in basic vocabulary, occasional lapses in precision still occur, likely due to haste or insufficient attention to contextual meaning (Panggabean et al., 2023).

In stark contrast, the term “equivalent fractions” proved to be a significant challenge for the vast majority of students. Only 18 out of 64 students (approximately 28%) were able to provide the correct Indonesian translation – “pecahan senilai”. The remaining 46 students either produced incorrect translations or left the term untranslated altogether. This striking finding underscores a critical gap in students’ mastery of specialized mathematical terminology, despite its centrality to the mathematics curriculum at both the school and university levels. The term equivalent fractions is not merely a lexical item but represents a fundamental conceptual understanding in mathematics, and the inability to translate it accurately suggests a corresponding lack of conceptual grasp (Nurlaila & Irlina, 2021).

The nature of the errors committed by students in translating “equivalent fractions” is particularly revealing. A wide array of incorrect translations emerged, including “pecahan setara” (a literal but non-standard rendering), “persamaan ekivalen” (equation equivalent), “pecahan yang sama” (the same fractions), and “himpunan yang ekivalen” (equivalent sets). These errors reflect a predominant reliance on literal, word-for-word translation strategies, where students attempted to map each English word onto an Indonesian equivalent without considering the established terminological conventions in mathematics. The persistence of such errors indicates that students have not internalized the correct pedagogical and mathematical terminology, and may not have encountered the term frequently enough in

meaningful contexts to recognize its standardized translation (Panggabean, et al., 2023).

The data in table 2 carry important pedagogical implications for the Mathematics English course and the broader curriculum. While students demonstrate adequate proficiency in basic mathematical vocabulary, the substantial difficulties with terms like “equivalent fractions” reveal a need for more targeted instruction focused on specialized terminology. The findings suggest that vocabulary teaching should move beyond simple definitions and incorporate repeated exposure to terms within authentic mathematical contexts, such as textbook excerpts, problem-solving tasks, and classroom discussions. Furthermore, students should be explicitly taught to recognize that certain mathematical terms have fixed, conventional translations that cannot be derived through literal decoding. Addressing these gaps is essential for equipping students with the lexical and conceptual tools necessary for engaging with English-language mathematical texts and for succeeding in their future academic endeavors (Pakaja et al., 2025).

Students demonstrated a strong grasp of basic terms like “fraction,” “number line,” and “smallest.” However, a significant challenge arose with the term “equivalent fractions.” Only 18 students (28%) provided the correct translation, “pecahan senilai.” The remaining 46 students produced a wide array of incorrect translations, often translating “equivalent” literally as “ekivalen” or “persamaan,” demonstrating a failure to recognize the established mathematical terminology in Indonesian.

3.3. Translation of Pedagogical Vocabulary

The text also included terms related to teaching and learning processes. Students faced even greater difficulty with this category, as shown in table 3.

Table 3. Translation accuracy of pedagogical vocabulary (n=64).

English term	Correct translation	Number of students with correct translation	Examples of student errors
Task	Tugas	28	Tes, materi, pembelajaran, pertanyaan, (36 students made errors/no answer)
Cognitively demanding task	Tugas yang menuntut kemampuan kognitif / Tugas yang memerlukan kognisi tinggi	5	Tugas mengembangkan secara kognitif, materi untuk mengukur kognitif siswa, kemampuan kognitif tugas, tugas kognitif, penilaian kognitif (59 students made errors/no answer)
Instructional task	Tugas instruksional / Tugas dalam pembelajaran	8	Materi instruksional, task instruksi, menginstruksikan maksud tugas, arahan tugas (56 students made errors/no answer)
Learning opportunities	Kesempatan belajar	10	Keberuntungan belajar, pembelajaran menguntungkan, peluang yang didapatkan (54 students made errors/no answer)

Table 3 provides a comprehensive analysis of students’ translation accuracy regarding pedagogical vocabulary – terms specifically related to teaching, learning, and instructional design. Unlike mathematical terminology, which often has fixed and widely accepted equivalents, pedagogical vocabulary presents unique challenges due to its contextual nature and the nuanced meanings embedded within educational discourse. The table examines four key terms, particularly “task”, “cognitively demanding task”, “instructional task”, and “learning opportunities”. The data reveal a striking pattern of difficulty across all four terms, with accuracy rates ranging from alarmingly low to moderately acceptable. These findings underscore the extent to which students struggle with the specialized language of educational research, despite its direct relevance to their future professional practice as educators.

The term “task”, which carries the straightforward and commonly used Indonesian equivalent “tugas”, was correctly translated by only 28 of the 64 students (approximately 44%). The remaining 36 students either produced incorrect translations or left the term unanswered. Among the erroneous renditions were “tes” (test), “materi” (material), “pembelajaran” (learning), and “pertanyaan” (question) – all of which represent distinct concepts in educational contexts. This confusion suggests that students may not fully grasp the specific meaning of “task” as a structured learning activity, instead conflating it with

related but distinct pedagogical constructs. The relatively low accuracy rate for such a fundamental term raises concerns about students' foundational understanding of basic instructional vocabulary.

Even more concerning are the results for the compound term “cognitively demanding task”, which was correctly translated by a mere 5 students (fewer than 8% of the sample). The correct Indonesian equivalent – “tugas yang menuntut kemampuan kognitif” or “tugas yang memerlukan kognisi tinggi” – requires not only lexical knowledge but also an understanding of the conceptual distinction between cognitively demanding and less demanding tasks. The errors produced by the remaining 59 students reveal a consistent pattern of oversimplification or literal translation. Common mistakes included “tugas mengembangkan secara kognitif” (tasks that develop cognitively), “materi untuk mengukur kognitif siswa” (material to measure students' cognition), and “tugas kognitif” (cognitive task). These translations either shift the meaning entirely or reduce a complex pedagogical concept to a vague reference to cognition, demonstrating that students struggled to comprehend the term significance within the context of the source text.

The translation of “instructional task” yielded similarly poor results, with only 8 students providing the correct equivalent – “tugas instruksional” or “tugas dalam pembelajaran”. The errors committed by the other 56 students ranged from partial translations to complete misunderstandings. Examples such as “materi instruksional” (instructional material) and “task instruksi” (a hybrid English-Indonesian phrase) indicate that students recognized the word “instruction” but failed to accurately render the complete concept. Other errors, such as “menginstruksikan maksud tugas” (instructing the purpose of the task) and “arahan tugas” (task direction), reflect attempts to paraphrase the term without a clear understanding of its precise meaning in educational research. These difficulties suggest that students lack familiarity with the standard Indonesian terminology used in academic discourse about teaching and learning.

The term “learning opportunities” was correctly translated by only 10 students as “kesempatan belajar”. The errors produced by the remaining 54 students are particularly revealing of the pitfalls of literal translation. Examples such as “keberuntungan belajar” (learning luck) and “pembelajaran menguntungkan” (advantageous learning) demonstrate a reliance on word-for-word decoding, where “opportunity” was erroneously rendered as “luck” or “advantage” rather than the contextually appropriate “opportunity” or “chance.” Other translations, such as “peluang yang didapatkan” (obtained opportunities), while closer in meaning, still lack the precise pedagogical connotation of the original term. These errors highlight a fundamental issue in the students' translation approach: the tendency to treat vocabulary items as isolated words to be matched with dictionary equivalents, rather than as concepts embedded within a specific disciplinary context that requires interpretation and adaptation.

Collectively, the data in table 3 reveal a critical gap in students' ability to translate pedagogical terminology accurately. The consistently low accuracy rates across all four terms – particularly those representing complex instructional concepts – suggest that the Mathematics English course has not adequately prepared students to engage with the specialized language of educational research. These findings carry significant implications for curriculum development. Instruction must move beyond general English vocabulary and mathematical terminology to include explicit teaching of pedagogical language within authentic academic contexts. Students need opportunities to encounter, analyze, and use such terms repeatedly, not in isolation but as part of meaningful discourse about teaching and learning. Only through such targeted intervention can future educators develop the lexical and conceptual competence necessary to access international educational literature and contribute meaningfully to their professional community (Iksora et al., 2022).

The results show a high rate of error for pedagogical terms. For instance, “cognitively demanding task” was correctly translated by only 5 students. Most students attempted literal, word-for-word translations, resulting in phrases that were either meaningless or conveyed a different meaning. Many students left these terms untranslated or wrote the English word. This suggests a lack of familiarity with educational terminology in both English and Indonesian.

4. Discussion

The findings of this study confirm that sixth-semester mathematics education students at UIN Syekh Ali Hasan Ahmad Addary Padangsidempuan encounter significant challenges

in translating English academic texts. The analysis of their translations reveals two primary issues: difficulty with specialized terminology and a problematic translation process (Iksora et al., 2022).

First, the students' errors were more pronounced in pedagogical vocabulary (e.g., cognitively demanding task, instructional task) than in basic mathematical vocabulary (e.g., fraction, number line). This aligns with Kusumawati's (2017) findings that students struggle with terms that have specific meanings within the context of educational research. While students may have been exposed to mathematical terms in English, terms describing pedagogical approaches, cognitive processes, and instructional design appear to be less familiar. The wide variety of incorrect translations for "equivalent fractions" also indicates a gap in their mathematical English, suggesting that even subject-specific terms taught in the Mathematics English course may not be fully internalized.

The differential performance of students in translating pedagogical versus mathematical vocabulary constitutes one of the most significant findings of this study, revealing important insights into the nature of their difficulties with English academic texts. As the data in tables 2 and 3 demonstrate, students demonstrated considerably higher accuracy when translating basic mathematical terms such as "fraction", "number line", and "smallest" – terms that are foundational to the mathematics curriculum and frequently encountered in both instructional materials and classroom discourse. In contrast, their performance deteriorated markedly when confronted with pedagogical vocabulary, including terms such as "cognitively demanding task", "instructional task", and "learning opportunities". This disparity suggests that students' exposure to English in the context of mathematics education has been predominantly oriented toward mathematical content, with insufficient attention devoted to the language of teaching and learning that is equally essential for engaging with educational research literature.

To add, Kusumawati (2017), Hartati et al. (2023) reported that mathematics education students encounter particular difficulty with terms that carry specific meanings within the context of educational research. This congruence across different institutional contexts strengthens the validity of the conclusion that pedagogical vocabulary represents a persistent challenge for students in this discipline. The explanation for this phenomenon lies partly in the nature of the Mathematics English course curriculum, which typically emphasizes mathematical terminology, problem-solving language, and classroom expressions directly related to teaching mathematics. While this focus is appropriate given the course objectives, it may inadvertently leave students underprepared for the demands of translating research articles, where pedagogical concepts and methodological terminology feature prominently alongside mathematical content.

The challenges associated with pedagogical vocabulary are compounded by the conceptual complexity of the terms themselves. Unlike mathematical terms such as fraction or number line, which denote concrete mathematical objects or representations, pedagogical terms like cognitively demanding task refer to abstract constructs that encompass multiple dimensions of teaching and learning. Translating such terms requires not only lexical knowledge but also conceptual understanding of the educational theories and frameworks within which these terms are embedded. When students encounter the phrase cognitively demanding task, for instance, they must recognize that it refers to learning activities that require higher-order thinking processes, problem-solving, and metacognitive engagement – not merely tasks that involve cognition in a general sense. The absence of this conceptual grounding leads to the kind of oversimplified or inaccurate translations documented in table 3.

The wide variety of incorrect translations for the mathematical term equivalent fractions provides an important counterpoint to the general pattern of stronger performance on mathematical vocabulary. While 62 students correctly translated basic terms, only 18 accurately rendered equivalent "fractions" as "pecahan senilai". The remaining students produced a diverse array of errors, including "pecahan setara", "persamaan ekivalen", "pecahan yang sama", and "himpunan yang ekivalen". This finding indicates that even within the domain of mathematical terminology, students struggle with terms that represent more complex conceptual relationships. "Equivalent fractions" are not merely a vocabulary item but a concept that embodies the relationship between different fractional representations of the same quantity. The translation errors suggest that students may not have fully internalized this conceptual understanding, highlighting the interdependence between language mastery and conceptual knowledge in mathematics education.

Taken together, these findings carry important implications for the design and delivery

of the Mathematics English course. The data suggest that even subject-specific terms explicitly taught in the course may not be fully internalized by students, particularly when those terms represent complex concepts or are encountered infrequently. This points to the need for instructional strategies that promote deeper engagement with terminology through repeated exposure in meaningful contexts, explicit attention to conceptual understanding alongside lexical knowledge, and opportunities for students to encounter and use terms across multiple texts and tasks. Furthermore, the pronounced difficulties with pedagogical vocabulary indicate that the curriculum should be expanded to include more systematic attention to the language of educational research, preparing students not only to teach mathematics in English but also to engage critically with the international literature that will inform their professional practice and academic development.

Second, the dominant translation strategy observed was literal, word-for-word translation. Students appeared to approach the text as a series of isolated words to be decoded, rather than as a coherent message to be understood and re-expressed. This approach violates the fundamental principle of translation, which prioritizes the transfer of meaning over form (Bassnett, 2002; Sarki, 2005). By failing to first comprehend the overall context and purpose of the text, students were unable to find appropriate equivalents for multi-word terms like “cognitively demanding task.” This was evident in the awkward and nonsensical translations produced. The time constraint likely exacerbated this issue, preventing students from moving beyond the initial decoding stage to the “refinement stage” where they could review and improve their translations for naturalness and accuracy in Indonesian.

The predominance of literal, word-for-word translation as the primary strategy employed by students represents a fundamental obstacle to achieving accurate and meaningful translations of academic texts. This approach, which treats the source text as a sequence of discrete lexical units to be decoded individually, stands in direct opposition to the established principles of translation theory (Hartati et al., 2023). As Bassnett (2002) and Sarki (2005) emphasize, the essence of translation lies in the transfer of meaning rather than the mechanical reproduction of linguistic forms. When students approach a text with the mindset of decoding words rather than comprehending messages, they inevitably produce translations that may preserve the surface structure of the SL but fail to convey its intended meaning in the TL. The data from this study provide compelling evidence of this phenomenon, with numerous examples of translations that are grammatically awkward, semantically incoherent, or entirely divorced from the original text communicative purpose.

The consequences of literal translation strategies are particularly evident in students’ handling of multi-word terms and complex phrases, such as *cognitively demanding task*. Rather than recognizing this phrase as a unified conceptual entity with a specific meaning within educational discourse, students attempted to translate each component word separately, resulting in renditions such as “*tugas mengembangkan secara kognitif*” (tasks that develop cognitively) and “*kemampuan kognitif tugas*” (cognitive ability of tasks). These translations not only misrepresent the original meaning but also create confusion by introducing concepts not present in the source text or by omitting essential nuances. The failure to comprehend the phrase as a coherent whole reflects a deeper issue: students are not reading for meaning but are instead engaged in a mechanistic decoding process that bypasses the interpretive work essential to successful translation.

The theoretical framework provided by Sarki (2005) offers a useful lens for understanding why students become trapped in literal translation patterns. Sarki conceptualizes translation as a three-stage process comprising comprehension of the source text, transfer of meaning into the TL, and refinement of the translated text. The findings of this study suggest that many students, under the pressure of time constraints, become stuck in the initial comprehension stage – or more accurately, they never genuinely enter it. Instead of seeking to understand the overall context, purpose, and argument of the text, they immediately begin the transfer process at the word level, attempting to map English lexical items onto Indonesian equivalents without first constructing a mental representation of the text meaning. This premature transfer inevitably produces translations that are fragmented, incoherent, and often nonsensical when read as continuous prose.

The time constraint imposed on the translation task likely played a significant role in reinforcing this dysfunctional approach. With only 90 minutes to translate a text of approximately 200 words, students may have felt pressure to produce a complete translation quickly, leading them to prioritize speed over depth of comprehension. Under such conditions, the temptation to resort to word-for-word decoding is understandable, as it

provides a seemingly straightforward path to completing the task. However, this approach ultimately proves counterproductive, as it prevents students from reaching Sarki's refinement stage – the crucial phase in which translators review their work, identify awkward or inaccurate renderings, and revise them for improved naturalness and fidelity to the original meaning. The absence of this refinement stage in most students' translation processes is evident in the final products, which contain errors that could potentially have been corrected upon review.

The pedagogical implications of these findings are substantial. If students are to develop genuine translation competence, they must be explicitly taught to resist the temptation of literal decoding and instead approach texts with a meaning-oriented mindset. This requires instructional strategies that model and scaffold the comprehension stage of translation, teaching students to read actively for main ideas, contextual clues, and authorial purpose before attempting to transfer meaning into Indonesian. Additionally, students need opportunities to practice the refinement stage, perhaps through peer review activities or guided self-assessment, where they can learn to identify and correct errors in their own translations. Finally, the time allocated for translation tasks should be structured to accommodate both comprehension and refinement, with explicit expectations that students will engage in multiple passes through the text rather than a single, linear decoding process. Only through such pedagogical interventions can students move beyond literal translation toward the meaning-based competence that authentic academic communication requires (Fadillah, 2025).

The implications of these findings are clear. The Mathematics English course needs to place greater emphasis on contextual reading and comprehension strategies. Students should be trained to read the entire text or paragraph to grasp the main idea before attempting to translate individual sentences. Specific instruction should be dedicated to common pedagogical terms and the concept of equivalence in translation, teaching students that a single English word or phrase may not have a single, fixed Indonesian equivalent and must be understood within its context. Furthermore, incorporating a revision phase into translation tasks is crucial to allow students to refine their work and produce more coherent and accurate target texts (Parinduri, 2020).

The findings demonstrate that the students' translation difficulties arose from the interaction between limited disciplinary vocabulary, insufficient conceptual understanding, and an overreliance on literal translation strategies. Although most students were able to translate familiar and frequently encountered mathematical terms accurately, their performance declined when they encountered complex mathematical concepts and pedagogical terminology requiring contextual and disciplinary knowledge. These difficulties were further intensified by a translation process that prioritized word-level substitution over holistic comprehension and provided limited opportunity for revision and refinement. Therefore, developing students' academic translation competence requires an integrated instructional approach that combines systematic vocabulary development, conceptual understanding, contextual reading, meaning-based translation, and guided revision. Rather than treating translation as the mechanical replacement of English words with Indonesian equivalents, the Mathematics English course should present it as an interpretive and communicative process in which linguistic knowledge, disciplinary competence, and awareness of context operate together. Such an approach would better prepare mathematics education students to engage critically with international academic literature and communicate specialized educational knowledge accurately and appropriately across languages.

5. Conclusions

This study examined the translation errors made by 64 sixth-semester mathematics education students at UIN Syekh Ali Hasan Ahmad Addary Padangsidimpuan when translating an English academic text into Indonesian. The findings demonstrate that the students experienced varying levels of difficulty depending on the complexity and disciplinary context of the vocabulary. Basic mathematical terms, such as "fraction", "number line", "smallest", and "largest", were generally translated accurately, indicating that the students possessed adequate knowledge of commonly used mathematical vocabulary. However, considerable difficulties emerged when they encountered more specialized mathematical terminology, particularly "equivalent fractions", as well as pedagogical terms such as "cognitively demanding task", "instructional task", and "learning opportunities". The low

accuracy rates for these terms indicate limited familiarity with the specialized language used in mathematics education research and insufficient understanding of the concepts represented by particular academic expressions.

The analysis further revealed that many translation errors resulted from the students' reliance on a literal, word-for-word translation strategy. Rather than interpreting words and phrases within the broader context of the source text, many students treated them as isolated lexical units and attempted to identify direct Indonesian equivalents. Consequently, several translations were inaccurate, unnatural, or inconsistent with established mathematical and pedagogical terminology. The findings demonstrate that successful academic translation requires more than general vocabulary knowledge. It also requires contextual comprehension, disciplinary knowledge, and the ability to reconstruct the intended meaning naturally and accurately in the TL. The limited time allocated to the translation task may also have reduced the students' opportunities to review, revise, and refine their work, thereby contributing to errors in accuracy, clarity, and coherence.

These findings highlight the need to strengthen translation instruction within Mathematics English and other ESP courses. Instruction should provide greater exposure to authentic mathematics education texts and place greater emphasis on specialized mathematical and pedagogical terminology. Students should also be encouraged to read complete sentences and paragraphs, identify the central meaning of the source text, and consider disciplinary context before selecting appropriate Indonesian equivalents. Furthermore, translation activities should incorporate systematic revision and reflection to help students identify literal translations and improve the naturalness and accuracy of their work. Such instructional practices may enhance students' academic translation competence and better prepare them to access, understand, and use English-language research in their future academic and professional activities.

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